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# Turning off the Tap: Strategies for Hazardous Waste Minimization in the City of Los Angeles

Cal-Tech Management Associates, Sacramento, CA

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# TURNING OFF THE TAP:

## Strategies for Hazardous Waste Minimization in the City of Los Angeles

April 1987

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in collaboration with the

**MAYOR'S ADVISORY COMMITTEE ON HAZARDOUS WASTE REDUCTION**

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This document is a report on strategies for hazardous waste minimization for the city of Los Angeles. The report recommends twenty-two actions for the city within a waste minimization program that has the three following attributes: 1) It must stress the primacy of "source reduction" -- the prevention of generation -- over other management options; 2) It must recognize that toxic wastes are a "multi-media" phenomenon and must give equal attention to the three media of air, water, and land; 3) It must recognize the need to set priorities among generators, tailoring the program to assist "higher risk" and less-responsive players first.

The document examines the following topics: Waste Reduction in a Regulatory Context; Hazardous Materials and Waste Management in Los Angeles City and County; Types of Source reduction and local case studies; the elements of a local government waste reduction program: information and technical assistance; incentives and disincentives for waste reduction; financing waste reduction in the public and private sectors. The document concludes with a 24 page bibliography.

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Also deserving recognition for their good work in the preparation of this report are Peter Deibler, Kate Gianolini, Marie Phillips, Jeff Ridgway and Elena Schmid. It is fair also to acknowledge our indebtedness to the research and ongoing work carried out by David Roe at the Environmental Defense Fund and Susan Sherry at the Golden Empire Health Planning Center. Both have provided creative and effective leadership on this issue.

Finally, we wish to thank Mayor Tom Bradley and Deputy Mayor Tom Houston. Without their vision and active support, Los Angeles would not have the constructive agenda for hazardous chemical management that it now enjoys.

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# FORWARD

The City of Los Angeles established the Hazardous and Toxic Materials (HTM) Project on July 1, 1988 to implement the recommendations found in this report. Established within the Board of Public Works, the HTM Project's goal is to ensure that the City conforms to and promotes the national hazardous waste minimization policy. The Project provides direct regulatory and waste minimization assistance to City departments, industry and businesses that use hazardous materials and generate hazardous wastes. The HTM Project utilizes new and existing City resources to promote an integrated approach to environmental protection based on the concept of pollution prevention.

This non-regulatory project addresses water and air quality, toxic materials, and solid and hazardous waste. Designated as the lead agency in hazardous waste reduction, the HTM Project works in cooperation with all City departments including Airports, Department of Water and Power, Harbor and the Bureau of Sanitation. The services and assistance available fall into the following categories:

**Information Clearinghouse.** An information resource center is being developed to provide access to literature sources, contacts, and case studies on waste reduction techniques for specific industries or waste streams. Waste reduction reports published by the federal government and the State are also available. Regulatory information, contact numbers and specific instruction is also provided.

**On-site Technical Assistance.** HTM Project staff provides comprehensive environmental and waste minimization assessments to businesses and City departments. During an on-site visit, detailed process and waste stream information is collected. The information is analyzed, and a series of waste reduction options are identified Regulatory requirements are also reviewed.

**Outreach.** HTM Project staff gives presentations on pollution prevention to industries, trade associations, professional organizations, and citizen groups. Depending on the audience, these programs range from an overview of the City's HTM Project to in-depth discussions of technologies and regulations for specific industries .

**Mayor's Award for Achievement in Pollution Prevention.** This award program honors companies in Los Angeles that have exhibited outstanding achievement in waste minimization and pollution prevention. The awards program was initiated by the Mayor Tom Bradley on October 25, 1988. The award will be announced at the annual Mayors' Pollution Prevention Conference in April.

For additional information call or write:

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# TABLE OF CONTENTS

Chapter I Setting The Stage For Pollution Prevention . . . . . . . . . . . . 5

Chapter II Waste Reduction In A Regulatory Context . . . . . . . . . . . . 15

Chapter III Hazardous Materials and Waste Management In Los Angeles City and County . . . . . . . . . . . . . . . . . 34

Chapter IV Types of Source Reduction and Local Case Studies . . . . . . . 46

Chapter V The Elements of a Local Government Waste Reduction Program: Information and Technical Assistance . . . . . . . . . . . . . . . . . . . . . . . . 63

Chapter VI Incentives and Disincentives For Waste Reduction . . . . . . . 86

Chapter VII Financing Waste Reduction In The Public and Private Sectors . . . . . . . . . . . . . . . . . . . . . . . . . 95

Conclusions and Recommended Actions . . . . . . . . . . . . 107

Source Documents . . . . . . . . . . . . . . . . . . . . . . . 116

# CHAPTER I

# SETTING THE STAGE FOR POLLUTION PREVENTION

The City of Los Angeles has the opportunity at present to make a major step forward in the control of hazardous chemical wastes generated within its boundaries.

This report, which has been prepared as a guide for local policymakers, outlines the issues and makes a series of recommendations for specific actions that should be the cornerstone of an intelligent pollution prevention program. Its intent is to keep the "next generation" of hazardous and often cancer-causing material out of the waste stream in order to avoid the risks and problems caused by past practices.

Reducing hazardous chemical waste at or near its source of generation is not too complex an issue for local government to address. Substantial reductions can often be made through simple actions. While science and engineering expertise are needed in advanced systems modification, on a less technical level it is equally important that public policy be enacted that encourages waste generators to change their habits. Attentiveness and persistence on the part of public officials can lead to waste reduction in the 20% 50% range over a five-year period, thereby serving the environmental and public health interests of local residents and workers while promoting increased efficiency and reduction of liability for local businesses.

In this report, it is implicit that local government leadership should act aggressively in its own interest to limit the potential risks of hazardous chemicals, without waiting for the emergence of long-overdue guidelines from the federal or state government. It must be remembered that hazardous wastes, by definition may "either cause or contribute significantly to an increase in mortality, or in serious illness that is irreversible or reversible but with continuing incapacitation, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

Many hazardous wastes are further defined as "high-priority wastes" which have properties particularly hazardous to human health (toxicity), which can accumulate in living organisms (bio-accumulation), and which remain hazardous for a long time (persistence), or which pose increased potential for air emissions, due to their volatility, and groundwater contamination due to seepage through soil (mobility).

Often, hazardous wastes are identified by their physical/chemical properties, which include "ignitability" (the ability to catch fire), "corrosivity" (the ability to destroy other materials, including human tissue), and "reactivity" (the ability to enter into a violent chemical reaction which may involve explosion or fumes). This is serious business.

There is no need to list the horror stories that result from the mismanagement or unpredictable release of hazardous chemical waste. The newspapers have reported them with alarming regularity over the years. While it is undoubtedly true that practices are better now in some measure due to self-generated responsiveness in the manufacturing sector there is much progress yet to be made. By enacting and supporting the recommendations in this report, the City of Los Angeles will illuminate its concern and set a model for others to follow.

## INTRODUCTION

Hazardous waste is a multi-media pollutant, not simply a land disposal problem. A comprehensive and effective response must focus on unregulated toxic air emissions and disposal of contaminated liquid wastes into the sewer system in addition to the more recognized oversight of treatment, storage and disposal of wastes on-site and off-site.

Waste reduction is critical to the prevention of future hazardous waste problems, yet response to the simple truth of this fact has been slow to develop. As was noted in a recent Congressional study:

> "Although there are many environmental and economic benefits to waste reduction, over 99% of Federal and State environmental spending is devoted to controlling pollution *after* waste is generated. Less than 1% is spent to reduce the generation of waste. The current level of national spending for pollution control is $70 million. Two-thirds of this is spent by industry."

While this level of expenditure may have been required to comply with earlier environmental legislation that was fully oriented toward clean-up of pollution, it is now time to recognize present circumstance and adjust our policies accordingly.

It is time to make the "prevention" of pollution a higher priority than "management" or "treatment" of pollution. As a consequence, new policies will need to be enacted, and an updated system of rewards and disincentives put in place.

Turning off the tap is clearly more sensible than mopping up the floor time and again as the sink continues to overflow.

This report does not address toxic wastes that are generated by households, nor does it address toxic contaminants that occur naturally in the local environment or that are present in food products or other goods that are purchased by consumers. All of these are significant and deserve consideration, but they are beyond the scope of this investigation, which focuses on those wastes that are generated in the production of goods and services in the local economy.

## THE CONTEXT

Chemical substances play a major role in the high standard of living we enjoy. Among other things, these substances have made improvements possible in our clothing, food, shelter, transportation and entertainment. Yet the last few years have been full of reminders that these benefits are not without cost.

Failure to manage hazardous chemicals safely is an increasing burden on industry and government, and an ongoing threat to public health and environmental quality.

Since the issue of hazardous waste management captured the public's attention in the late 1970's, there has been an accelerating effort nationwide to understand and deal with a host of immediate and often unanticipated problems. Much of the effort has focused on clean-up of existing hazardous dump sites that contaminate ground water and threaten the health of nearby residents. Other activities seek to develop alternatives to the land disposal of hazardous wastes through stiffer regulations and the implementation of technologies that provide greater control and safety.

In addition to the health effects of improperly managed hazardous wastes, there are measurable economic losses. A recent study indicated that costs related to toxic contamination for clean-up, regulation, litigation, health care and resource losses add up to a $4 billion-a-year bill for Californians.

Nationwide, U.S. industry produces over 572 billion pounds per year of hazardous wastes (over 250 million tons) as defined under Federal law. These are largely solid and liquid wastes. In addition, seven billion pounds of just 86 of the hundreds of hazardous chemicals are being emitted into the air each year, and another 324 million pounds are being discharged directly or indirectly to our waterways. Moreover, the Congressional Budget Office estimates that the amount of hazardous wastes generated by industry may well increase as much as 10% by 1990.

How does this relate to the City of Los Angeles? What do we know about hazardous waste generation at the local level?

Although precise figures are unavailable, estimates reported in *The Problems and Needs for the Management of Hazardous Wastes in Southern California* (SCAG, 1985) lead us to believe that approximately 1.5 million tons of hazardous wastes were generated in the City of Los Angeles in the benchmark year of 1983. This volume of waste material, which may be increasing, is the byproduct of a healthy local economy, yet it poses perplexing problems as well as a sizeable target for reduction efforts.

Where does this waste go? Until recently, about half was managed at the point of generation. The remainder was transported offsite for treatment or disposal. Due to tighter government regulation, this is a process in transition. At present, no landfills in the metropolitan area can accept hazardous wastes. Four were closed in the early 1980's, and the remaining one closed its gates in late 1984. Currently, all offsite wastes must be transported to Class 1 facilities in northern Santa Barbara County or in Kings County for disposal.

In light of startling economic and population growth for the Los Angeles area, projected well into the future, one can see the need for the benefits provided by source reduction strategies. They include the following:

- **Safer Workplaces** - many waste reduction techniques focus on more careful handling of hazardous chemicals or on substitutions of less hazardous chemicals, thereby decreasing worker exposure.
- **Safer Highways** - reducing the generation of wastes reduces the number of hazardous cargoes on the highway.
- **Decreased Need For New Treatment and Disposal Facilities** - less waste may mean fewer new facilities, thus less capital investment and fewer siting controversies.
- **Healthier Environment** - by reducing potential health hazards such as groundwater contamination, air pollution, fires and explosions.
- **Avoided Clean-up Costs** - preventing the generation of wastes instead of dumping them into the ground allows society to forego massive future costs (to clean up existing problem sites, the new Superfund Bill being debated in Congress may require as much as $10 billion to be collected from industry over the next five years).
- **Greater Profits** - more efficient manufacturing processes plus avoided transportation and disposal costs can mean greater profits for industry. Some companies have saved millions of dollars by concentrating on pollution prevention. For example, the 3M Corporation reports savings of $235 million since 1975.
- **Avoided Liability** - hazardous waste reduction means that generators entrust fewer wastes to transporters and disposal sites which may handle these wastes improperly. Strict liability provisions in existing law argue for minimal waste production to minimize exposure to legal action.

The waste that is generated in Los Angeles comes from large and small businesses and other sources.

Without question, the largest proportion of the waste stream is generated by large firms in the manufacturing sector. Major contributors to the waste stream are local industries in the business of petroleum refining, aircraft manufacture, electronics and aerospace.

While many of these industries have found alternatives to landfill disposal for some of their residues, it must be recognized that substantial volumes of hazardous waste are still generated on a regular basis, indicating that "reduction at the source" has received only limited recognition in practice.

In 1981, the Governor's Office of Appropriate Technology released a landmark study entitled *Alternatives to Land Disposal of Hazardous Waste: As Assessment for California*. This report characterized the waste streams (the individual types and volumes of hazardous waste that are generated in each region of the state), and concluding that up to 75% of the waste that had been going to landfills could be better managed by alternative technologies or recycling. These findings have had a profound effect on public policy, yet even that report did not address serious waste reduction as a significant influence on pollution issues. This is mentioned only to point out that an evolution in public policy has been rapidly occurring since the late 1970's as those who shape the decisions gain further awareness. That evolution is just now turning into the conscious recognition that a "reduction mentality" is the best frame of mind for problem-prevention related to toxics.

According to data released by the state Department of Health Services in 1983, the County of Los Angeles was the third largest source of hazardous wastes generated by counties statewide, ranking just behind Contra Costa County and Kern County. At that time, it was apparent that over 20% of the hazardous waste generated statewide had its derivation in Los Angeles County.

Table 1-1 presents a more recent summary of the higher-volume wastes generated in Los Angeles County as reported on transporter's manifests. Only those wastes that were moved from the site of generation to another site for treatment or disposal are included. Although no hard data exist, it is reasonable to assume that at least two times this volume of hazardous waste was managed on-site during the same time period.

## The 10 Largest Hazardous Waste Streams Generated In Los Angeles County for Offsite Disposal or Treatment in 1986

| DHS CODE | TONS | DESCRIPTION |
|---|---|---|
| 221 | 89,379 | Waste oil and mixed oil |
| 611 | 71,460 | Contaminated soil from cleanups |
| 181 | 44,182 | Other inorganic solid waste |
| 135 | 32,352 | Unspecified aqueous solutions |
| 222 | 30,352 | Oil/water separation sludge |
| 223 | 21,374 | Unspecified oil-containing waste |
| 214 | 21,252 | Unspecified solvent mixture |
| 213 | 15,044 | Halogenated solvents |
| 151 | 14,685 | Asbestos-containing waste |
| 132 | 13,995 | Aqueous solutions with metal |
|  | 353,996 Tons * |  |

* These 10 categories represent about 70% of the total volume of 480,000 tons reported for seventy-eight waste categories.

(Source: State Department of Health Services, Hazardous Waste Information System, M-10 file, March 1987)

As we begin to discuss methods that can be used in the City of Los Angeles, it is important to have a few basic definitions in mind and to recognize that there is an on-going debate about the meaning of certain terms that are frequently used.

### FUNCTIONAL DEFINITION OF HAZARDOUS WASTE

Recognizing that a multi-media approach to hazardous waste reduction is necessary, it is appropriate in this instance to define hazardous waste as "all non-product hazardous outputs into all environmental media, even though they may be within permitted or licensed levels."

This definition, which has been adapted from a recent Congressional study, is much broader that those found in Federal law pertaining to hazardous waste management per se, but is reflective of the need to include all pollutants that are generated, discharged, emitted or disposed of routinely or accidentally. In nearly all cases, hazardous waste outputs are amenable to some degree of avoidance or reduction, and it is further important to have a definition that lessens the opportunities to shift waste from a more regulated to a less regulated environmental medium, i.e., from landfill into the sewer system.

## DEFINITION OF WASTE REDUCTION

There are several terms, often used interchangeably, in the common vocabulary, none of which have a standard definition. Waste avoidance, waste elimination, waste prevention, waste reduction, source reduction, waste abatement and waste minimization are in common use.

It is generally agreed by all parties that minimizing the amount of hazardous waste sent to land disposal should not obscure the even more fundamental goal of reducing the generation of hazardous waste in the first place. This simply reiterates the principle that pollution prevention takes priority over waste management.

In essence, there are two approaches to this definition. The first and perhaps most stringent is the one put forth in a report entitled *Serious Reduction of Hazardous Waste* (Office of Technology Assessment, U.S. Congress, September 1986. OTA defines waste reduction as "in-plant practices that reduce, avoid, or eliminate the generation of hazardous waste so as to reduce the risks to health and environment." As the report points out, this is consistent with the concept of pollution prevention (i.e., it doesn't recognize waste minimization or recycling as a reduction strategy), and it focuses specifically on what occurs at the point of generation. It sees that the goal of waste reduction is to alter current practice and to design future industrial processes to reduce the degree of hazard and the amount of waste to be managed, controlled and regulated.

Another definition one that may be more functional in the Los Angeles context is put forth in the June 1986 report from the Environmental Defense Fund entitled *Approaches to Source Reduction: Practical Guidance from Existing Policies and Programs*. In this report, source reduction is defined as "those measures that reduce the amount of hazardous substance that is imposed on whatever system society sets up for coping with its hazardous waste."

The EDF definition aims to reduce the amount of hazardous substances that are left over as a residue from the process of producing useful goods and services. It is in contrast to "waste reduction", which implies that waste is being acted upon after it has irrevocably become waste, e.g., by incineration or other means.

Recycling and recovery are included in the EDF definition of source reduction (because they cut down on the amount of hazardous materials that permanently leave the production process), but incineration is excluded because it is essentially a waste treatment technology. Dewatering is also excluded from the definition, as it is seen as a means to reduce the volume of hazardous wastes but not the toxicity. The criterion, then, is whether a particular activity reduces the number of toxic molecules that ultimately must be treated as waste.

The Advisory Committee has not taken a position on either definition, but it is our observation that the EDF definition may offer more flexibility for local action. The definition from OTA, which is solely focused on industrial processes, may be more suitable as the groundwork for Federal regulation which may emerge in the next year or two.

It is important for policymakers in Los Angeles to adopt a results-oriented perspective on hazardous waste minimization. There is little reason to spend a lot of time on hair-splitting among various definitions, yet it is worth taking the time to understand the three principal problems that arise as a consequence of imprecise terminology.

These problems are as follows:

- Definitions often include pollution control activities (offsite recycling, incineration) as well as pollution prevention activities. This blurs the critical distinction between prevention and management.
- Several terms currently are used to describe preferred methods of dealing with hazardous waste, yet no standard definition exists for any of these terms. Each is defined differently by each user.

- Often, definitions do not apply to all hazardous wastes. Most apply reduction only to RCRA defined wastes (excluding those wastes regulated under the Clean Air Act and the Clean Water Act), or include only toxic wastes (excluding hazardous non-toxic wastes), or deal only with regulated wastes (excluding most toxic air emissions).

In other words, we should not confuse waste reduction with pollution control. Pollution control is primarily a means to protect the public and the environment from contamination. Waste reduction, which includes pollution control, also recognizes the economic benefits of minimizing the use of (and need for) waste disposal sites, reduced costs for transport of wastes, diminished liability and a weakened incentive for illegal dumping.

# CHAPTER II

# WASTE REDUCTION IN A REGULATORY CONTEXT

## INTRODUCTION

The concept of reducing hazardous waste at the source, the point of generation, has only recently become a major focus for state and federal policymakers. Although hazardous waste management became a regulatory concern for state officials in 1972, phrases such as "resource conservation" and "recycling and resource recovery" first appear in 1976 in federal statute and in 1977 in state statute. Specific requirements for hazardous waste recycling first appear in 1977 in state law. Not until the development of the California land disposal restrictions in 1982 and the 1984 amendments to the federal Resource Conservation and Recovery Act is there explicit recognition of the importance of, and potential for, waste reduction.

In the last decade some private sector firms have actively sought opportunities for waste reduction. But for the great majority of waste generators, as well as for state and local government, source reduction is just coming to the fore.[1] A variety of factors are converging to provide direct and indirect incentives and disincentives for serious progress on the most important hazardous waste solution - turning off the tap where the leak occurs. Pollution prevention is moving into the driver's seat.

Much has been said about the need to encourage waste reduction, yet government agencies have often been unsure what their role should be. Source reduction has been perceived as highly site-specific, requiring techniques and technologies geared to a specific industry and frequently even a particular plant. While this can be the case, technical studies also demonstrate that source reduction techniques are often relatively simple and can be broadly applied.[2]

Although private sector waste reduction policy and investment decisions will be made in corporate board rooms and by the presidents of small businesses, it is clear that there is much that government can do to facilitate and encourage greater use of source reduction in the private sector. This section demonstrates that local governments are in the best position to encourage source reduction.

What is the role of waste reduction in a comprehensive waste management strategy? Why is waste reduction only now widely perceived to be a crucial piece of such a strategy? To answer these questions it is necessary to look at the evolution of the "hazardous waste problem", and to examine the major governmental efforts to mandate or encourage improved waste management.

### The Evolution of Hazardous Waste Management: An Overview

In 1972 California enacted one of the first comprehensive hazardous waste control laws in the nation.[3] This early legislation defined hazardous waste and required the state Department of Health Services (DHS) to develop policies for the handling, processing and disposal of hazardous waste. The California law, and especially California's manifest system for tracking the generation and final disposition of wastes, became the model for the first federal attempt to regulate hazardous waste, the Resource Conservation and Recovery Act of 1976 (RCRA).[4]

Implicit in the language of these early federal and state statutes is the assumption that wastes will be generated and that the primary question is what to do with them once they exist, not how to avoid or minimize their production. The reliance of RCRA on "end-of-the-pipe" solutions is apparent, for instance, in a near total focus on the permitting of facilities used for the treatment, storage or disposal of hazardous waste. While permitting requirements are essential to ensuring that these facilities are designed and operated safely, active waste reduction can help minimize the need for such facilities.

### Recycling

In 1977 the California statute was amended to promote the use of reduction, exchange or recycling as alternatives to reliance on land disposal.[5] The operative provisions of these amendments address recycling and the exchange of wastes, and they have helped to highlight the importance of recycling in California.

The requirements of the 1977 amendments are outlined below followed by a summary of the most recent data for the recycling and exchange of hazardous wastes in California.

## Basic Recycling and Waste Exchange Provisions of California Law

The 1977 amendments require the state Department of Health Services to:

- Promote recycling and encourage the reduction and exchange of hazardous wastes.
- Investigate the market potential and feasibility of hazardous waste recycling.
- Maintain a clearinghouse of information on wastes that might be recyclable, and require generators to submit such information regarding their hazardous waste streams as is required to appear on a waste manifest.
- Maintain a revised listing of hazardous wastes that DHS finds are economically and technically feasible to recycle and require generators to justify why any listed waste has not been recycled. Monetary penalties were later added to strengthen these provisions.

**Note:** Additional provisions regarding the recycling of waste oil have recently been added to the Health and Safety Code. Other more recent recycling and reduction activities of the Department are summarized later in this chapter.

[Source: "Recycling of Hazardous Waste in California, 11/1/85 to 10/31/86", Department of Health Services, January 1987, p.1. The referenced statutory language is found in sections 25170 and 25175 of the Health and Safety Code.]

## Hazardous Waste Recycling and Exchange in California

Recycling data for California indicate that:

- During 1985 about 365,000 tons of hazardous waste were sent to offsite recycling facilities. This figure represents about 19% of all wastes manifested for offsite transport.

- Comparable data for 1984 (273,000 tons, or 17% of that year's manifested waste) indicate a gradual but steady increase in the relative role of offsite recycling. Less complete data for 1983 indicate a figure of less than 200,000 tons for offsite recycling.
- Additional but unknown volumes of waste are recycled onsite or are used offsite (and are not required to be manifested) in industrial processes as substitutes for virgin materials.

Waste exchange information for California indicates that:

- There has been a slow and steady increase in the use of the exchange.
- Because the use of the exchange, by both parties, is voluntary and confidential there is little data on the volumes of waste successfully exchanged. Offsite recyclers seeking wastes to recycle have been a major user of the exchange. Thus the exchange may also be a major contributor to California's recycling efforts.

**Note:** A large increase in total manifested wastes in 1985 is probably due to increased economic activity. Between 1983 and 1984 the Department focused on increasing public awareness and enforcement with respect to the recycling provisions.

[Sources: "Recycling of Hazardous Waste in California, 11/1/85 to 10/31/86" , Department of Health Services, January 1987, pp. 2-3; "California Waste Exchange - A Newsletter/Catalog", Department of Health Services, Volume 6, Number 1, 1987, p.3; and Conversation with Robert McCormick, Department of Health Services, March 17, 1987.]

## THE ROLE OF LAND DISPOSAL

Land disposal historically has been, and remains today the predominant endpoint for most hazardous wastes generated in California, and particularly for those wastes transported to offsite facilities. Land disposal techniques include landfills, surface impoundments (toxic pits), and underground injection (deep wells).

For decades the prevailing wisdom among technical experts was that wastes would not migrate into surrounding soils or groundwater aquifers once placed in the ground. Land disposal facilities operated with minimal or often no safeguards against contamination. Not surprisingly, land disposal was "dirt cheap", and there was little incentive to reduce, recycle or treat wastes.

By 1976 state and federal laws were in place that appeared, at least at the time, to provide adequate safeguards. But in the late 1970's it became increasingly obvious that land disposal had resulted in a nationwide legacy of environmental contamination. By the early 1980's it also became clear that the newer requirements for land disposal of the 1970's were also themselves insufficient to prevent future contamination.

New York's Love Canal and California's Stringfellow Acid Pits provided the impetus for the 1980 passage of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as the "federal Superfund". Originally funded at $1.6 billion, the legislation was recently reauthorized for a total of $9.0 billion.

State superfund legislation followed in 1981 to fund the cleanup of hundreds of California sites that would not be addressed by the federal program. The costs of non-prevention are enormous. A 1985 report by the California Commission for Economic Development estimated that the cleanup of the major sources of toxic contamination in California, including land disposal, could exceed $11 billion.[6]

The weaknesses of land disposal hit southern California in dramatic fashion with the closure in the early 1980's of four of the region's hazardous waste landfills. The loss of the land disposal option culminated in the December 1984 closure of the area's last remaining "Class 1" facility. By early 1985 the higher cost of trucking wastes to the two nearest operating land disposal facilities in Kings County and Santa Barbara County provided generators in Los Angeles a strong incentive to seek reduction, recycling and treatment opportunities.

To further complicate the situation, leakage had been detected at many of the "state-of-the-art" land disposal facilities around the country. These "RCRA facilities" had been built or retrofitted to meet the regulatory requirements developed by the

Environmental Protection Agency. For the first time land disposal facilities were required to monitor for leakage. The results of the monitoring led to general acceptance of the notion that there is no such thing as a "leak-proof" landfill. Increasingly, hazardous wastes have no place to go.

During 1983 and 1984, the federal and state governments developed new and far more comprehensive technical requirements for the siting, design, construction and operation of land disposal facilities.[7] The new requirements greatly increased the cost of land disposal, with the new prices more accurately reflecting the true costs of the technology and providing a boost to waste reduction and other waste management options.

A 1985 report released by a spectrum of public interest groups found that every remaining Class I landfill in the state was out of compliance with present operating requirements, could not meet the new requirements, and was leaking.[8] Concern grew that present land disposal practices were resulting in a mushrooming contamination problem.

## A CHANGE OF PERSPECTIVE: CALIFORNIA TAKES THE LEAD

In 1981 the California Governor's Office of Appropriate Technology (OAT) took the nation's first comprehensive look at alternative means of managing hazardous waste. With *Alternatives to the Land Disposal of Hazardous Waste: An Assessment for California*, OAT developed a new hierarchy of waste management options placing land disposal as the last rather than the first option. The report, and the perspective it provided, have helped to shape subsequent federal and state law. The hierarchy is presented below.

### A Hierarchy of Waste Management Options

The Office of Appropriate Technology's hierarchy from most to least preferred, is as follows:

- Reducing wastes at the source of generation;

- Recycling those wastes that can not be eliminated through reduction and re-using reclaimed materials;
- Treating wastes that can not be recycled in order to reduce their toxicity and mobility;
- Using high temperature incineration for wastes that cannot be treated.
- Using land disposal only for wastes that cannot be managed by any of the above methods.

[Source: Stoddard, S. Kent, et al, Alternatives to Land Disposal: An Assessment for California, Governor's Office of Appropriate Technology, pp. 4-5.]

The OAT report provided a detailed analysis of the volumes and composition of California's hazardous waste streams and matched those waste streams with feasible recycling, treatment and incineration techniques. OAT concluded that over 75% of the wastes sent to California's major landfills could instead be recycled, treated or incinerated.

The OAT report led to the promulgation in 1982 of DOHS regulations banning the land disposal of specific waste streams according to a proscribed schedule. Restricting the land disposal of hazardous wastes provides the most direct incentive for generators to explore other options, including of course waste reduction. The first phase of the ban took effect in early 1983.

The "California List" was incorporated into federal law with the 1984 RCRA reauthorization, thus providing the first nationwide schedule for restricting hazardous wastes from land disposal. The first phase of the federal ban took effect in November 1986.

Recently enacted California legislation restricting the use of land disposal includes Senator Carpenter's SB 509 of 1985 and Senator Roberti's SB 1500 of 1986. SB 1500 provides that by 1990 no untreated waste may be sent to land disposal, and establishes the statutory basis for a fundamental redefinition of land disposal as the technology of last resort to be used only for treated waste residues and low-hazard wastes.

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Beginning in 1983 a series of state and federal efforts provided tighter requirements intended to minimize the risks of specific forms of land disposal, and of underground tanks used to store hazardous materials and wastes. These efforts include:

- AB 3566 (1984) by Assembly Member Katz, the "Toxic Pits Act", provided requirements for surface impoundments in addition to those required by the 1984 RCRA amendments or the State Water Resource Control Boards Subchapter 15 regulations. Unless exempted, the statute mandates the closure of toxic pits that threaten groundwater and places stringent requirements on the future operation of the remaining facilities.
- AB 2058 (1985) by Assembly Member Connelly for the first time brought deep well injection practices under a comprehensive state program. Because deep wells are regulated by the federal government through the Safe Drinking Water Act, they were excluded from the 1976 and 1984 RCRA provisions applying to other land disposal technologies. AB 2058 requires submittal of information on past discharges to wells, and prohibits future discharges unless the well is fully permitted and the discharge would not threaten groundwater. The bill also contains requirements for monitoring and closing wells and places conditions on the issuance of any new deep well permit.
- AB 3525 (1984) by Assembly Member Calderon requires the first monitoring of the air, soil and groundwater around the state's 1500 municipal solid waste landfills. Toxic substances are present in these landfills in the form of leachate from hazardous wastes disposed illegally and legally, methane generated as a result of the decomposition of organic matter, and from the breakdown of commercial products such as plastics.
- Assembly Member Sher's AB 1362 (1983) and Assembly Member Cortese's AB 2013 (1983) require that underground tanks be permitted, monitored, and upgraded in order to detect and prevent leakage and contamination. In 1981, underground tanks used to store hazardous materials for the electronics industry in the San Jose area were found to be leaking. The state effort resulted from the passage of a number of local ordinances aimed at the regulation of underground storage tanks.

## THE DIVISION OF RESPONSIBILITIES: FEDERAL, STATE AND LOCAL

With minor exceptions, it is possible to generalize about the roles of federal, state and local government in relation to hazardous waste management:

- Federal Government: Federal responsibilities focus on the cleanup of past practices via the 1980 and 1986 Superfund legislation.
- State Government: Because California has authorization to administer the federal RCRA program, the state's responsibilities are primarily the day-to-day management of hazardous wastes from "cradle to grave", including oversight of the manifest system, the inspection and enforcement requirements for hazardous waste treatment, storage and disposal facilities, and coordination of hazardous material and waste transportation requirements. And, as noted below, the state DHS has begun to play a larger role in waste reduction.
- Local Government: Many local governments, such as the Los Angeles County Department of Health, maintain generator inspection programs through memorandums of understanding with the state DOHS. Local government land use and zoning powers are a powerful tool for planning future waste management needs.

## ENTER SOURCE REDUCTION

The concept of avoiding or minimizing waste generation appeared in 1977 in statute and provides one of the underpinnings of the California land disposal restriction program. And yet the federal and state governments together annually spend about $4 million on waste reduction efforts, or less than 0.1% of total government spending on pollution control.[9] About one-quarter of this is spent in California.

The 1984 federal RCRA amendments for the first time specifically require generators to examine source reduction, stating:

> "The Congress hereby declares it to be the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste nevertheless

generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment."

The pertinent 1984 RCRA provisions are summarized below:

## The 1984 Resource Conservation and Recovery Act Amendments: Requirements for Waste Reduction

The amendments:

- Set as national policy the goal of, "...minimizing the generation of waste and the land disposal of hazardous waste by encouraging process substitution, materials recovery, properly conducted recycling and reuse, and treatment."
- Require that generators, and applicants for new permits to store, treat or dispose of hazardous waste at the site of generation, certify at least annually that a program is in place to reduce the volume and toxicity of the waste, ...to the degree determined by the generator to be economically practicable."
- Require that generators describe, as part of any generator's biennial report to the EPA, "...the efforts undertaken during the year to reduce the volume and toxicity of waste generated.", as well as "...changes in volume and toxicity of waste actually achieved during the year in question in comparison with previous years, to the extent (prior year) information is available..."
- Directs the Administrator of EPA to submit a report to Congress, "...on the feasibility and desirability of establishing standards of performance or of taking other additional actions...to require the generators of hazardous waste to reduce the volume or quantity and toxicity of the hazardous waste they generate, and of establishing...required management practices or other requirements to assure such wastes are managed in ways that minimize present and future risks to human health and the environment. Such report shall include any recommendations for legislative changes which the Administrator determines are feasible and desirable..."

[Source: Hazardous and Solid Waste Amendments of 1984, Referenced passages are from sections 1003(b)(6), 3002(a)(6), 3002(b), 3005(h) and 8002(r) of the amended Solid Waste Disposal Act.]

The 1984 RCRA amendments state that waste reduction is to be a national priority and requires that generators certify that they are seeking opportunities for waste reduction. EPA has not yet finalized the form to be used for generator certification, and it is too early to say how effective these provisions will be.

The uncertainty over exactly how the federal government should proceed in encouraging or mandating waste reduction is perhaps best understood by examining the conclusions and recommendations of two documents. The first report was issued in September 1986 by the Congressional Office of Technology Assessment, and the second was released in October 1986 by the EPA in response to the RCRA amendment mandate to report back to Congress regarding further ideas on waste reduction.

The two reports differ sharply on the degree to which the federal government should now be committed to waste reduction. Despite the differences in the recommendations of the two reports, which are outlined below, they agree on the overwhelming need for the development of more data. This is a task that can best be addressed at the state and especially the local level. The federal standoff represented by these two reports also shows the importance of state and local governments beginning to act on their own, not waiting for the development of a comprehensive federal program.

### Two Views of the Federal Role in Furthering the Goal of Waste Reduction

The EPA report concludes that:

- Mandatory standards of performance and required management practices are not presently feasible or desirable.
- The effect of the land disposal restrictions and other mandates from the 1984 amendments should be quantified and analyzed.
- The Agency can not report back to Congress before December 1990 on the need for a major waste minimization regulatory program.

The EPA report recommends that the following strategy be pursued in the near-term:

- Information Gathering: Collection of data on waste volume and composition and other aspects of waste management. Much of this is already occurring at the state and local level.
- Core Waste Minimization Program: This program would involve near-term efforts such as development of guidance materials for the new RCRA waste reduction reporting provisions, technical assistance to the states and to generators in developing waste minimization programs, and assistance to specific states in developing targeted programs of technical assistance to generators.

The OTA report, however, concludes that:

- EPA has little commitment to waste reduction, either in terms of funding or of actively overseeing the implementation of the RCRA land disposal laws.
- A strong statement of federal policy and a visible EPA commitment, such as creation of an Office of Waste Reduction, is necessary. A federal program should involve technical and financial assistance to the states to set up independent State Waste Reduction Boards to provide high visibility at the state level in implementing state waste reduction programs.
- The nature of waste reduction is such that, at least for the present, development of specific federal standards would be inappropriate.

The OTA report provides a menu of options and advocates a far higher level of visibility and commitment of resources then EPA believes is appropriate.

[Sources: Report to Congress - Minimization of Hazardous Waste, U.S. EPA, October 1986, summary page, and Serious Reduction of Hazardous Wastes, Congressional OTA, pp.4-5, 15 and 73.]

## THE GROWING ROLE OF LOCAL GOVERNMENTS

There are four major factors that have together helped to increase the role of local governments in hazardous waste management:

- Passage and implementation of local ordinances regarding underground tanks and disclosure of information in response to the "public right-to-know" about the local use and handling of toxic substances.
- Assembly Member Maxine Waters' AB 2185 (1985) provides for increased local emergency response planning and the collection of detailed data on the handling and use of toxic substances. Much of the data collected in this process may be of benefit in targeting local government waste reduction efforts.
- Assembly Member LaFollette's AB 3777 (1986) requires local administering agencies to oversee the development of plans and adoption of techniques for risk management by businesses handling hazardous materials. The legislation is intended to reduce the probability of serious accidental explosions or releases of hazardous materials such as occurred recently at Union Carbide facilities in the US and India. Local agencies will begin implementation of this statute later this year.
- AB 2948 (1986) by Assembly Member Tanner makes explicit the central role of local governments in planning for future hazardous waste management. AB 2948 provides local governments with the money to do planning, and also alters existing provisions to allow counties to levy a tax or user fee of up to 10% of the annual gross receipts resulting from the operation of multi-user offsite waste storage, treatment and disposal facilities.

The implementation of all four of these programs will significantly increase the importance of the local government role by 1990. In addition, there has been recognition of the value of building a strong waste reduction component into the county and city plans developed through the Tanner process.[10]

There is also ongoing interest in developing new source reduction programs at the federal and state level. As noted earlier, new federal programs are not likely to be developed in the near future. Should local governments wait to see if new state programs will be developed? No. Local efforts can complement growing state involvement, in fact they often serve as models.

The state legislature has developed an interest in waste reduction and several bills are now in early stages of consideration in the legislature.[11] Even if these measures are signed into law this year they will become one of many competing priorities within the state DHS. Considering the start-up time needed for a new state program, little in the way of local assistance could reasonably be expected from the state for the first year or so.

In the past two years, however, the Alternative Technology Division of the state DOHS has developed an effective, albeit underfinanced, source reduction program that provides the cornerstone for a greater state commitment to source reduction.

### Source Reduction Activities of the State Department of Health Services

Two years ago the Department initiated a four-point waste reduction program consisting of:

- Technical assistance
- Economic incentives
- Information transfer
- Regulatory inducements

**Technical Assistance:** The Department has focused on technical means for managing and reducing solvent wastes. The Department has also contracted for waste audits to be conducted for three to five sample firms in each of five industries including: paint formulation, pesticide formulation, auto repair shops, circuit board manufacturers and auto paint shops. This information will be used to create "self-audit" checklists for use in these five industries.

**Economic Incentives:** The Department has an annual $1 million grant program, created under AB 685 by Assembly Member Farr, to fund waste reduction projects. Projects can be funded in any of four stages from feasibility study through to the evaluation of project performance. The program in 1986, its first year, funded 26 projects from a total of nearly 100 applications.

**Information Transfer:** The Department has conducted symposia to disseminate the findings of the solvent management study, as well as symposia targeting the waste management and reduction needs of specific industries.

**Regulatory Inducements:** Inducements for waste reduction include the state and federal land disposal laws, the Department's regulations requiring generators to submit biannual reports regarding types and quantities of wastes shipped offsite, and the new federal requirement that generators certify on each waste manifest that a waste reduction program is in place.

Source: "Recycling of Hazardous Wastes in California, November l, 1985 to October 31, 1986", A Report to the Legislature, State Department of Health Services, January 1987.

## LOCAL GOVERNMENT WASTE REDUCTION EFFORTS IN CALIFORNIA

The City of Los Angeles should not wait for additional federal or state action. The City is faced with the need to begin planning now. The problems of siting hazardous waste management facilities, for instance, speak to the value of a vigorous waste minimization effort to decrease the need for offsite treatment and disposal facilities, and to assure the public that those facilities that are sited are absolutely necessary. In the near-term it is local governments that can make a difference by designing programs tailored to local patterns of waste generation, building on the interactions that now occur daily between local agency personnel and hazardous waste generators.

Several counties are taking steps, some commencing well before passage of the Tanner legislation, to encourage source reduction. Some counties have set goals for waste minimization and others have specific programs for assisting the private sector in reducing waste.[12]

In general, these efforts have resulted from the recommendations endorsed by county boards of supervisors, and county hazardous materials commissions that include participation of government agencies, the private sector, public interest organizations and citizens. The following is a sampling of some of these efforts:

- Ventura County: In 1985, concerned with hazardous waste generators' dependence upon waste disposal, the Ventura County Environmental Health Department undertook a detailed assessment of hazardous waste generation and waste reduction potential in the county.[13] Targeting the County's 75 largest volume generators, the Department conducted onsite waste audits. Through working with these generators the County experienced a 70% drop in the overall use of land disposal by county generators. This program is discussed further in Chapter 5.

- Contra Costa County: In 1986 the Contra County Board of Supervisors adopted an ordinance containing general waste reduction recommendations.[14] It is the policy of the county to encourage source reduction, and the ordinance sets a goal for 1990 of reducing by 25% the volume and toxicity of hazardous waste going to land disposal. The ordinance does not, however, contain operative provisions that specifically direct county regulatory agencies or generators to examine waste reduction options.
- Santa Cruz County: In early 1986 the Santa Cruz County Board of Supervisors adopted a comprehensive ordinance for the local management of hazardous materials. The ordinance requires that persons seeking a permit to store, handle and use hazardous materials must submit a Hazardous Materials Management Plan detailing how each material is to be used, must use independent auditors to determine the best available control technologies or changes in process and manufacturing strategies to reduce the handling of hazardous material. Now in the initial state of implementation, it is too early to say exactly what effect these provisions will have on generators in Santa Cruz County. Early reports, however, are promising.

## FUTURE TRENDS

The future points to an increasingly vigorous role for local governments in determining waste management practices. The major pieces of state and federal hazardous waste legislation have been enacted, and the regulatory programs will approach a mature phase by the early 1990's. But many of the major problems of hazardous waste management remain.

There is still a major reliance on land disposal. A land disposal restriction schedule alone is not sufficient to ensure that reduction activities and alternative technologies will be in place as each deadline arrives. Already there is proposed slippage in some of the restriction deadlines. Although the rate of growth of waste generation has slowed, localities across the state face pressures to site new facilities for offsite waste treatment and disposal.

Neither the City of Los Angeles nor the City's generators should be complacent. The continued operation of southern California's remaining hazardous waste landfills should be considered a window of opportunity during which local planning for waste reduction and treatment capacity will be crucial to meet the upcoming land disposal restriction deadlines culminating in the 1990 deadline for disposal of untreated wastes.

Largely because the troubled Casmalia disposal facility is likely to remain in operation, the Los Angeles County Sanitation Districts have suspended a search for local sites for offsite land disposal facilities including "residual repositories", that would accept only the waste residues that remain following detoxification, low-hazard wastes, and possibly some wastes from contaminated site cleanups.

In any case, the combination of the statutory and regulatory programs discussed above and the factors discussed in Chapter 6 will drive:

- The greater use of onsite and offsite recycling,
- Continued growth in mobile treatment capacity,
- The development of detailed local data on waste generation rates, waste management practices and waste reduction potential,
- "Micromonitoring" of generators and of treatment, storage and disposal facilities by state and local agencies,
- Increasing need for offsite treatment and incineration capacity, and most fundamental,
- Increasing interest in all available means for minimizing waste generation.

As Chapter 6 will show, the City of Los Angeles can be an active participant in the process of reshaping waste management in southern California. Its leadership can bring a fresh perspective and a new set of remedies to the waste generation dilemma.

# CHAPTER II

## FOOTNOTES

[1] An important element in California's control of private sector behavior is its lack of an exemption for smaller volume generators. This important distinction in state and federal law is discussed in Chapter 6.

[2] See, for instance "Hazardous Waste Minimization Technology Transfer", Institute for Local Self-Reliance. This study looked at 118 modifications made by generators in 86 case studies and grouped these modifications into thirteen broad categories. Transfer of technology was found to be a problem only in the case of one category, modifications involving innovative technology and patented processes. This category only accounted for 10% of the total number of modifications.

[3] The California Hazardous Waste Control Law appears in Division 20 of the Health and Safety Code, section 25100, et seq.

[4] The Resource Conservation and Recovery Act provides for the state's to administer "RCRA-equivalent" programs that are at least as stringent as federal law. California state law supplants federal law except for areas, such as the source reduction language of the 1984 RCRA amendments and additional land disposal restrictions, in which California law does not have equivalent provisions.

[5] Waste exchange involves the trade, sale or gift of a material that one generator (Company A) considers to be a waste and that can not be further used by that generator, to another company (Company B) which can use the waste as an input in lieu of using new or virgin materials. Frequently Company B will have lower standards of purity for the raw materials it uses.

[6] Deibler, Peter M., *Poisoning Prosperity: the Impact of Toxics on California's Economy*, Commission for Economic Development, pp. 41, 52.

[7] See the 1984 amendments to the federal RCRA and the State Water Resource Control Board's "Subchapter 15" regulations governing land disposal practices.

[8] Environmental Defense Fund, et al, *Nowhere to Go*, p ii. The findings of the report are based on a review of facility records maintained by state and federal regulatory agencies.

[9] *Serious Reduction of Hazardous Waste*, Congressional Office of Technology Assessment, pp. 16-35.

[10] See, for instance the, "Model Resolution on Waste Source Reduction for Adoption at the Local Government Level", developed by the Local Government Commission, Sacramento, (916) 448-1198.

[11] See SB 714 by Senator Roberti, introduced March 5, 1987, and AB 496 by Assembly Member Hayden, introduced February 5, 1987.

[12] Los Angeles area programs, such as the Source Reduction Research Partnership developed as a joint effort of the Metropolitan Water District and the Environmental Defense Fund and the Southern California Association of Governments' North Hollywood small generator project are discussed in Chapter 3.

[13] *Progress Report on Ventura County Hazardous Waste Volume Reduction and Alternative Technology Program: An Assessment of Hazardous Waste Generation and Reduction Activities in Ventura County*, Ventura County Environmental Health Department, April 1986, pp 1-2.

[14] Report of the Contra Costa County Hazardous Waste Task Force, April 1986.

# CHAPTER III

# HAZARDOUS MATERIALS AND WASTE MANAGEMENT IN LOS ANGELES CITY AND COUNTY

## INTRODUCTION

Los Angeles City and County agencies, as well as the City Council and the Board of Supervisors, are involved in a broad range of activities related to the management of hazardous materials and wastes. With regard to regulatory authority, County agencies in some cases function for the City and in others the City operates independently of the County.

As noted in the previous chapter, local governments generally have responsibility for planning, and by arrangement with the state, often have responsibility for inspecting generators and enforcing provisions of state and federal law related to hazardous waste management. This section takes a brief look at these responsibilities and the interactions among them in order to provide an institutional context for the waste reduction recommendations that are presented elsewhere in the report.

## REGIONAL ACTIVITY

**Southern California Hazardous Waste Management Project:** The Los Angeles region has a seven year history of hazardous waste management planning that grew out of the sharp reduction in available land disposal facilities of the early 1980's.

The Southern California Hazardous Waste Management Project began in 1980, with membership by Los Angeles County and a number of other counties, and a mandate to site new hazardous waste landfills to replace those recently closed. The effort was staffed by the Southern California Association of Governments (SCAG). In 1984 the effort shifted toward a broader process of planning for the region's future hazardous waste management needs with elements including waste generation studies, projections of the need for onsite and offsite treatment capacity, and for residual repositories.

In July 1985, most of the participants in the Project, with Los Angeles County a notable exception, signed a joint powers agreement creating the Southern California Hazardous Waste Management Authority and giving it a formal planning mission. As noted below, Los Angeles County has decided to proceed with its own hazardous waste planning and siting activities. The primary activities of the Authority are presented below:

**Regional Activities**
**Southern California Hazardous Waste Management Authority (SCAG)**

- Implementation of AB 2948 (Tanner)
- Data Collection and Management
- Facility Needs Assessment
- Facility Siting
- Relatively Minor Waste Reduction Component

Cities as well as counties may join the Authority. The City of Los Angeles is a participant, and Council Member Joy Picus is the current President of the Authority. A parallel private sector organization, the Southern California Coalition for Hazardous Materials Management, was founded in 1985 as a project of SCAG's Regional Institute of Southern California, a nonprofit partnership of government representatives and business managers. The Coalition was formed at the suggestion of participants of the Authority who needed an avenue of communication with the southern California business community, an organization that could provide a clear and consistent voice for the needs and concerns of the business community.

The Authority's FY 1986 workplan was budgeted at $430,000 and included a mix of hazardous waste planning activities:[1]

- Identify and circulate for review preliminary siting needs for treatment technology. (15%)
- Work with the counties to incorporate new hazardous waste management sites into the county solid waste management plans. (15%)
- Monitor and evaluate the "Action Program" of the joint powers agreement to site, permit and construct new facilities. (15%)

- Work with local government staff to identify opportunities to streamline and accelerate facility permitting processes. (10%)
- Develop, adopt and apply guidelines for "host jurisdictions" that site hazardous waste facilities to be compensated by the other jurisdictions using those facilities. (10%)
- Use and expand the Project's public information and participation network. (10%)
- Develop the format for a regional hazardous waste databank. (10%)
- Work with local government staff and the Coalition to develop an incentive program for onsite reduction and recycling of hazardous waste. (5%)
- Develop a report for cities and counties on collection service needs of small volume hazardous waste generators and households. (5%)
- Monitor state and federal hazardous waste legislation and regulation. (5%)

As the above workplan elements indicate, waste reduction is not yet a major focus for the Authority. SCAG is now completing a waste reduction report under contract to the State Department of Health Services and due for release in June 1987.[2] SCAG staff interviewed representatives of a variety of businesses, mostly large and medium in size, to elicit industry opinions on what steps should be taken to further encourage onsite waste management. Preliminary findings indicate a desire to see government provide greater technical assistance and to accelerate permitting for onsite activities. In 1987 and 1988 the Tanner planning process (AB 2948) is expected to be the major focus for the Authority.

SCAG also participated in 1985 with federal EPA funding in a targeted effort to seek waste management alternatives for small-quantity generators, the "North Hollywood Pilot Project" led by the late City Council Member Howard Finn[3]. The Project is discussed further below with City hazardous materials and waste activities.

## LOS ANGELES COUNTY

**Los Angeles County Board of Supervisors:** The County Board of Supervisors has had a longstanding interest in improved management of hazardous wastes, with a primary focus on ensuring the availability of adequate offsite capacity for treatment and disposal. The hazardous materials and hazardous waste activities of the Board and of county agencies are shown below:

## COUNTY ACTIVITIES

### Board Of Supervisors

- Long-term hazardous waste planning
- Location of sites for treatment and disposal

**County Department of Health**

Hazardous Materials Unit*

- Generator inspections
- Emergency response team
- Enforcement - Hazardous Waste Strike Force
- AB 3777 (LaFollette) Risk Management and Prevention

**County Fire Department**

Hazardous Materials Section**

Implementation of:

- AB 2185 (M. Waters) Right-to-Know

**County Sanitation Districts****

- Regulate Sewer Discharges
- Facility Site Location
- Developing proposal for waste reduction assistance program

**County Department of Public Works****

- Refer hazardous waste incidents to municipal landfills to county health department

* Includes City of Los Angeles. ** Excludes City of Los Angeles.

**Los Angeles County Department of Health:** The County Department of Health functions for the entire County, including the City of Los Angeles, which has not had a separate health department for several decades.

The Hazardous Materials Unit's 50 personnel perform three major functions for the entire county:[4]

- Conduct inspections of generators to check for compliance with state and federal requirements regarding the handling of hazardous waste, with the exception of those generators permitted to treat, store or dispose of hazardous wastes onsite. The inspection program is conducted under the provisions of a memorandum of understanding between the County and the state Department of Health Services. The state inspects all treatment, storage and disposal facilities.
- Fields an emergency response team trained to respond throughout the county to incidents involving hazardous materials or hazardous waste.
- Enforces hazardous material and hazardous waste requirements through the Los Angeles County Hazardous Materials Strike Force, which works closely with the Los Angeles City Attorney's office. The Strike Force has an impressive record of convictions for cases involving serious violations of federal, state and local law.

In addition:

- The Unit reviews plans for the cleanup of spills or other contamination incidents for which the Department has issued a cleanup order. Most sites are referred to the state Department of Health Services for action.
- The Department's Environmental Hygiene Section responds to a monthly average of almost 400 complaints regarding the use of, and exposure to, hazardous materials or wastes. The Section has a physician and two toxicologists to assist in assessing potential or actual exposures to hazardous materials and wastes.

**Los Angeles County Sanitation Districts:** The County Sanitation Districts, among other responsibilities, regulate sewer discharges for most of the area of the County excluding the City of Los Angeles.[5] This activity includes issuing thousands of permits for dischargers of liquid industrial wastes, many of which still contain minor amounts of hazardous constituents at the point of discharge. There is growing concern over the cumulative impact of multiple small discharges on receiving waters over time.

In addition the Districts have been requested by the Board of Supervisors to develop a waste reduction program proposal. The Districts have not yet responded, although the large budget deficit facing the County may preclude initiation of a program this year.

Finally, following the decision of the County not to sign the joint powers agreement creating the Authority, Los Angeles County Sanitation has pursued facility siting efforts for the County. These efforts are similar in focus to those of the Authority. The search for one or more residual repository sites has been suspended following the decision of the state Department of Health Services' to permit the continued operation of the Casmalia facility.

**The Los Angeles County Fire Department:** The Fire Department has responsibility[6] for the implementation of the following:

- AB 2185, the 1985 statewide emergency response and "right-to-know" legislation by Assembly Member Maxine Waters.
- AB 3777, the 1986 legislation by Assembly Member LaFollette that requires development and implementation of risk management plans by most businesses that use hazardous materials.

The Fire Department is implementing AB 2185 for 53 cities as well as the unincorporated areas of the County. The City of Los Angeles, as discussed below, is separately implementing the provisions of AB 2185 and of the City's Article 57, Division 8, the hazardous materials disclosure ordinance.

In early April, the County Fire Department expected to begin the first phase of the AB 2185 emergency response and "right-to-know" program, mailing questionnaires regarding the use of hazardous materials to several thousand businesses that on the basis of earlier inspections are likely to be covered by the legislation. The department will eventually target almost 60,000 businesses that may use or handle hazardous materials. The County Department of Health anticipates that as a result of the AB 2185 implementation, the number of identified hazardous waste generators in the County, excluding the City, will increase from 12,000 to about 30,000.[7]

Implementation of AB 3777, the risk management legislation signed by the Governor in late 1986, will not begin until later this year.

**Los Angeles County Department of Public Works:** The Department of Public Works has the responsibility for solid waste management in the County with the exclusion of the City of Los Angeles. The Public Works Department refers incidents involving the illegal disposal of hazardous waste in municipal solid waste landfills to the County Department of Health.

## CITY OF LOS ANGELES

**The Mayor's Office:** The Mayor has undertaken two major efforts to inspire hazardous materials and hazardous waste management.

- Established the Mayor's Advisory Committee for Hazardous Waste Reduction to develop recommendations for the Mayor and the City Council regarding a City program to aggressively seek waste reduction opportunities.
- Approved a resolution for the hiring of a material safety data sheet coordinator to review the purchase and use of hazardous materials by City agencies.

The activities of the Mayor's office, the City Council and City agencies are presented below.

## CITY ACTIVITIES

### Mayor's Office

- Mayor's Advisory Committee on Hazardous Waste Reduction
- Approved resolution initiating City Program to review City purchase and use of hazardous materials

### City Council

- City hazardous materials disclosure ordinance

### City Fire Department

### City Board of Public Works

### Bureau of Sanitation

Implementing:

- Hazardous materials disclosure ordinances - Right-to-know
- AB 2185 (M. Waters)
- AB 3777 (LaFollette)
  - Risk management and prevention
- Regulates sewer discharges
- Develops alternative emergency response disposal options for household generators

**Los Angeles City Council:** The Council has long been active in issues of hazardous materials and hazardous waste management. The Los Angeles disclosure ordinance was one of the first in the state and anticipated by several years many of the requirements now incorporated into state law. Through the ordinance, the City is now collecting and reviewing detailed data on hazardous materials use that many other jurisdictions are just now beginning to collect through implementation of AB 2948 (Tanner).

**Los Angeles City Fire Department:** The Fire Department is implementing the City's hazardous materials disclosure ordinance, (commonly called the "right-to-know" ordinance) requiring businesses to submit hazardous materials inventories by January 1987.[8] The inventory provisions of the ordinance are similar to those of AB 2185. The Department is also responsible for implementing the emergency response provisions of AB 2185 for the City, ensuring that businesses develop individual emergency response plans. Area plans for coordinating emergency response activities over a wider area, and between public and private sector entities, will also be developed by the Fire Department. Additional funding would be of benefit in the implementation of Fire Department programs, especially data entry and analysis.

Jurisdictions, such as the City of Los Angeles, which had ordinances prior to a specified date, are given an extra year to implement the emergency response and disclosure provisions of AB 2185. The Department, however, intends to begin the AB 2185 process this year rather than waiting until next year.

The City Fire Department has now received hazardous materials inventories from between 12,000 and 15,000 business complying with the hazardous materials ordinance and AB 2185. The County Department of Health anticipates that up to 9,000 of these firms will be hazardous waste generators.[9]

**Los Angeles City Board of Public Works - Bureau of Sanitation:** One of the Bureau's major activities is issuing permits for sewer discharges within the City. In addition, the Bureau does solid waste planning for the City and is increasingly involved in issues at the intersection of solid waste and hazardous waste management such as providing alternative means of disposal for household generators.[10] Household hazardous wastes, in individually small volumes, are generally disposed of in municipal solid waste landfills. Although illegal in a strict sense, statewide there are few alternatives for household generators.

**The North Hollywood Pilot Project:** The purpose of this 1985 effort was to develop a comprehensive pilot program for small volume generators in a two square-mile study area of North Hollywood.[10] The study, conducted for SCAG by a contractor, conducted an inventory and found that over 60,000 gallons of hazardous waste, excluding dilute wastewaters, are annually generated in the North Hollywood area by small volume generators, and that as much as 10% of these wastes may be disposed of improperly.

The Project resulted in development of a management plan intended to provide small businesses in the study area with an economical and convenient method for managing wastes. The recommended management plan includes two phases and consists of:

- An informational program to inform small volume generators of their legal obligations and the potential risks to human health and the environment of improper management.
- A collection system used in conjunction with a locally- sited facility for the accumulation of small volumes of waste for bulk transfer to major waste management facilities. Solvents and recyclable oils would be recovered at centralized facilities and the remaining wastes either placed in land disposal or incinerated.

The Plan was intended to be "cost-effective" and capable of rapid implementation. Waste reduction was not a major focus of the effort. The set of recommendations has yet to be implemented by the City, both because of staff unavailability and a shortage of fiscal resources.

## OTHER ACTIVITIES

**Source Reduction Research Partnership:** A second notable regional activity, the "Source Reduction Research Partnership", is a new and unusual joint effort of the Metropolitan Water District of Southern California and the Environmental Defense Fund.[11] The Partnership results from the mutual concerns of the District and of the Environmental Defense Fund to prevent recurrence of the extensive drinking water aquifer contamination that has occurred in the San Fernando and San Gabriel Valleys. The Partnership, now in the start-up phase, will last two years and have a projected budget of approximately $600,000.

The Partnership will focus on chlorinated solvents, the class of chemicals that are the most common contaminants of groundwater in California.

It will be a practical "micro-analysis" of a specifically defined geographical area, and it will answer the question of "what can be learned if we really focus on the details of a particular situation?" Through extensive work with the users of these solvents, the Partnership hopes to identify and help implement specific steps for improving the management of solvents, and for reducing their use and the generation of solvent wastes. As such, it can be of substantial value in Los Angeles and as a model nationwide.

The work of the Partnership will be particularly timely as it coincides closely with the November 1986 implementation of the federal EPA ban on the land disposal of many chlorinated solvents. As a consequence, manufacturers and users of chlorinated solvents, and the generators of solvent waste, should be particularly receptive to the findings of this research effort.

# CHAPTER III

## FOOTNOTES

[1] Work plan for fiscal year 1986, Southern California Association of Governments.

[2] Conversation with Mark Alper, Southern California Association of Governments, 1987.

[3] *Hazardous Waste Management Plan For Small-Quantity Generators*, Southern California Association of Governments, May 1985.

[4] Conversation with Anastasio Medina, Chief of the Hazardous Materials Unit, Los Angeles' County Department of Health, March 13, 1987.

[5] Conversation with Kieran Bergin, Los Angeles County Sanitation District, March 11, 1987.

[6] Conversation with Inspector Len Moore, Los Angeles County Fire Department, March 23, 1987.

[7] See Footnote 4.

[8] Conversation with Norman Pate, Los Angeles City Fire Department, March 23, 1987.

[9] See Footnote 4.

[10] See Footnotes 2 and 3.

[11] Conversation with Dr. Katy Wolf, Director, Source Reduction Research Partnership, February 11, 1987.

# CHAPTER IV

# TYPES OF SOURCE REDUCTION AND LOCAL CASE STUDIES

## WASTE MINIMIZATION PRACTICES

The availability of literature documenting successful source and waste reduction programs is rapidly increasing. This is a natural development evolving from industry's recognition of the seriousness of the hazardous waste problem, in conjunction with tightening regulatory requirements. Throughout the country there are examples of effective applications and technologies, often led by industry's own efforts towards increased efficiency, so that it is now possible for source reduction literature to present precise case studies as examples of successful waste reduction to illustrate its feasibility and to serve as models for others to follow.

Most of these examples are for larger companies, due in large part to the fact that these companies have the capital resources, in-house expertise, and larger and more prevalent waste streams to stimulate action.

Source and waste reduction efforts can be thought of as a phased series of actions, from simple to complex, and costless to costly, which every business which generates hazardous waste in any amounts can undertake and develop over time. Such actions could include improved procedures for normal housekeeping and maintenance type practices, or certain more substantive changes in manufacturing processes geared towards improved efficiency, as well as more complex judgments and actions such as taking advantage of scientific advances that allow substitution of hazardous materials with non- or less-hazardous materials.

## THE DYNAMICS OF WASTE REDUCTION STRATEGIES

Waste reduction programs usually occur in phases, from initial to mature, as individual firms decide upon their ability to implement a program in conjunction with current requirements imposed by regulation. This recognition of phases is helpful when targeting programs, by pointing out different considerations affecting firms during different stages of a waste reduction effort and highlighting the need for different public policy responses to these considerations.

For example, dissemination of technical information is critical during the initial phase of a waste minimization effort, when generators are just beginning to explore the possibilities for their own processes. But as companies develop more advanced programs to achieve greater reduction levels, which require more capital-intensive techniques, more sophisticated approaches to technical assistance and financial support will be required.

The majority of firms in Los Angeles can be considered in the early stages of the waste reduction effort, especially smaller businesses, and thus technical information and simpler forms of assistance can best achieve results. As additional firms develop more sophisticated programs and enter the more advanced phases of waste reduction, public programs to assist them must change as well to adapt to the different requirements of the generators.

## FOUR CATEGORIES FOR HAZARDOUS WASTE REDUCTION AND EXAMPLES

Although there are numerous variations and the categories overlap somewhat, it is possible to identify four basic approaches to reducing hazardous waste generation. These are:

SOURCE SEGREGATION OR SEPARATION
PROCESS MODIFICATION
END PRODUCT SUBSTITUTION
RECYCLING AND REUSE

The first three approaches generally occur within the generator's plant while the fourth can also occur in off-site commercial facilities or between firms. Any or all of the approaches may be applicable to a given generator's waste stream, regardless of the size of the company.

## SOURCE SEGREGATION OR SEPARATION

Source segregation is the simplest and usually the least costly waste reduction method. It involves keeping waste streams separated, enclosed and away from other waste streams and the open environment, as a preliminary procedure anticipating reuse or recycling of the material. Recycling and reuse are often impossible when wastes are mixed. As an example, many electronics firms generate as waste both halogenated solvents and non-halogenated solvents. As long as these two solvents are separate they are easy to recover by distillation processes but, when mixed, distillation becomes prohibitively difficult. Source segregation can also be simple attention to maintenance and normal industrial housekeeping, such as preventing pumps, tanks and seals from leaking. Another simple procedure is to insure that toxic waste streams are not mixed with non-toxic waste streams, since the combined mixture would have to be managed as a toxic waste.

An example of a source segregation program follows:

In Torrance, California, Garrett Industries manufactures turbochargers for a variety of heavy vehicle and passenger car applications for both gasoline and diesel engines. The operation is a typical machine shop operation with drilling, milling, grinding and metal cutting. These operations produce waste halogenated solvents, metal bearing grinding sludges, lubricating oils and tool coolants.

This facility produces about 100 tons a year of mixed metal sludges that contain nickel, iron, aluminum and zinc.

By conducting a comprehensive sampling and analysis program to identify the major consitutents of various waste streams, based on data collected, Garrett has instituted a waste segregation program that will reduce the volume by 40 tons per year. These sludges will be processed to recover nickel, aluminum, etc., and will be returning a substantial amount of money. In this instance, waste stream segregation is a starting point that has the best economic potential for waste minimization.

## PROCESS MODIFICATIONS

Process modifications involve changes in the design and operation of plant processes to reduce the generation of hazardous wastes. This can include changes in raw materials used, changes in reaction conditions and procedures involving chemicals, and the retrofitting or replacement of machinery. Because process modification requires changes in the manufacturing process itself, it is one of the most difficult and expensive options and requires an intimate knowledge of the manufacturing process and technologies. Usually in-house engineers, consultants and equipment suppliers are all involved.

In a typical manufacturing plant, process modifications were often only considered for the purpose of improving efficiency to increase profits rather than preventing waste generation. But as waste disposal and raw materials costs rise, and regulatory requirements tighten, process modifications are being made more often for the combined reasons.

Examples of process modification include changes in process technology and equipment, changes in plant operations, and changes in process inputs.

## PROCESS TECHNOLOGY AND EQUIPMENT

An ongoing development has been the introduction of significant changes in the basic technology and equipment of industrial production, including modernization, and modification and enhanced controls on manufacturing equipment which has resulted in more efficient technologies that reduce the generation of wastes.

For examples, 3M replaced a chemical process to clean flexible metal electronic circuits with a strictly mechanical process. Amoco Chemicals modified a manufacturing process and reduced its ignitable and oily wastes by 60 to 70 percent. Lancy International designed a new process for Elkhart Products Inc. to remove oxides and render the surface of pipe fittings chemically inactive using nonhazardous solutions rather than a cyanide or chromic acid dip.

Major changes often require substantial technological development and often capital investment. It may be easier to make them when redesigning an entire process, operation or new plant than modifying part of an existing system. Equipment and technology changes, however, do not always require major process overhaul.

Dow Chemical reduced waste generation and production costs in an existing crude-product drying system when it installed a computer and on-stream analyzer to adjust the concentration of drying agent in the flow. Previously, samples and lab analysis of the flow was done six times daily and a drying agent was added by hand. The new automated system is able to keep the ratio of drying agent closer to optimal and therefore reduce the amount required by 37 percent.

## PLANT OPERATIONS

Improved plant management, meaning industrial housekeeping, can reduce waste generation as well. Examples of effective operation changes include:

- Improvements in preventive maintenance procedures
- Better handling of materials to eliminate leaks, spills, and fugitive emissions
- Changes in equipment cleaning methods to avoid or reduce use of hazardous materials
- Use of covers on tanks and containers to reduce vapor loss
- Computerization and automation of processes where desirable
- Increased separation of waste and facilities in process recycling

Stanadyne Co. reduced wastes in its metal plating operation by introducing a pause into the machine that moves parts in and out of tanks. This allowed solution adhering to the materials to drip back into the process tank rather than polluting the rinsing tank.

Exxon Chemical Americas installed floating roofs over its tanks of volatile solvents, significantly reducing emissions.

Daly-Herring Co. replaced a single baghouse system with two separate systems for two production lines of different pesticides so waste dust from each could be returned to production.

As these examples show, there are simple, low-tech technology opportunities which reduce wastes which are entirely within normal plant operation modification practices. Often, only parts of waste streams may be reduced, but implementation is typically relatively quick and inexpensive. Experience over time in many applications has shown that motivated workers are often the key to finding and exploiting effective opportunities.

Another example of waste reduction through changes in plant operations by more efficient material handling is the Borden Chemical Co.'s Fremont, California plant.

Since 1982 Borden Chemical Co.'s Fremont plant has reduced organics in its wastewater by 93 percent through four separate changes in its handling of phenol and urea resins, as follows:

1. Borden altered its method of cleaning the filters which remove large particles of resinous material as the resin product is loaded into tank cars. They began collecting the rinsewater instead of sending it down the floor drains and into the company's onsite wastewater treatment plant. This rinsewater can be reused as an input in the next batch of phenolic resin.

2. When loading urea resin, they began reversing the loading pump at the end of each load so that resin on the filters would be sucked back into the storage tank and would not be rinsed out as waste.

3. The company revised rinsing procedures for reactor vessels between batches. Previously, the 11,000 to 15,000 gallon chambers had been cleaned by filling them with water, heating and stirring the water to remove resin residues, and then draining the rinsewater into the plant's wastewater. The plant now uses a two-step process. A small, first rinse of 100 gallons of water removes most of the residue from the containers. Then a second, full-volume rinse is used to complete cleaning. The first 100 gallons of rinsewater is reused as input material for a later batch of resin. Water

from the second rinse is discharged as wastewater but has a lower phenol concentration than the previous volume of wastewater.

4. Procedures for transferring phenol from tank cars to storage tanks have been altered. Formerly, when the hose used to transfer the phenol from car to tank was disconnected, a small amount of phenol dripped down the drain -- enough to cause problems given the strict regulatory limitation for phenol. Now, the hose is flushed with a few gallons of water to rinse the last bit of phenol into the storage tank.

In addition to greatly reducing wastewater volumes, these changes have eliminated most of the hazardous solid wastes generated by the resin manufacturing processes because the company was able to discontinue use of the onsite evaporation pond to treat these wastewaters.

(Source: David Sarokin, et al., *Cutting Chemical Wastes* (New York: INFORM, 1985, pp. 97-102)

**PROCESS INPUTS**

Changes in raw materials, either substitution of a different material (such as water instead of organic solvents where possible) or materials with different specifications having lower levels of contaminants, is a direct and effective way to reduce hazardous waste generation.

For example, Scoville, Inc. replaced the solvent 1-1-1 trichloroethane with a water soluble cleaner for degreasing applications.

Riker Laboratories replaced organic solvents used to prepare coated medicine tablets with a water-based solvent.

Quite often, changing raw materials is followed by changes in the manufacturing process, or in the composition of the end product. Larger companies may be able to make these changes fairly painlessly, but smaller companies may be dependent upon their suppliers for changes in raw materials, and vendors may not be able to make changes for waste reduction purposes due to the cost of developing these new products.

## END-PRODUCT SUBSTITUTION

End-product substitution for hazardous waste reduction is the replacement of a waste-intensive product with one for which production or use does not involve the generation of any or as much hazardous waste.

One of the most widely used examples is the replacement of highly toxic PCBs as electrical insulating fluids with silicon oils.

Since waste-intensive products are often more hazardous in themselves, product substitutions can have the additional benefit of protecting workers who manufacture them and the public who uses them.

Changes in the design, composition or specifications of end products that allow fundamental changes in the manufacturing process or in the use of raw materials can lead directly to waste reduction.

For example, 3M reformulated a product to use a nonhazardous organic material instead of a metal alloy in its manufacture, thus eliminating a specific cadmium-containing hazardous waste.

A variation on this approach was developed by Dow Chemical Co. related to packaging. A powder insecticide widely used in landscape and horticultural businesses was originally sold in 2-pound metal cans which were required to be decontaminated prior to disposal. Dow's solution was to package the product in 4-ounce water soluble packets which dissolve when the product is mixed with water for use.

End-product substitution can be difficult because of the constraints imposed by customer acceptance of the product, or by performance specifications. Also, implementation may require significant and costly changes in the manufacturing process or the raw materials. Because of this, end-product is probably the most difficult waste reduction approach, requiring a philosophical commitment to hazardous waste reduction by industry over "business as usual", a certain amount of scientific and technical innovation, and finally customer acceptance and trust in the new product.

## RECYCLING AND REUSE

Recycling and Reuse is the practice of recovering usable materials from wastes. The simplest application is reusing a waste from a process directly as a raw material in that or another process on-site. Offsite recycling is also effective. For example, the ash from incineration of Los Angeles' sewage is going to be sent to a copper smelter in Arizona where the valuable metals will be reclaimed and the remainder of the ash will be used as a direct input in the manufacture of copper. Recycling can also be done between companies, using Waste Exchanges, or sent to commercial facilities for processing. Recycling and reuse is intimately connected with the waste reduction strategy of Source Segregation, for obvious reasons.

Most wastes require some type of processing before they may be re-used. Usually this involves removing impurities accumulated during the manufacturing process. The most commonly used example is the recycling of waste organic solvent by distillation to separate the clean solvent from impurities. Other commercially viable techniques include carbon adsorption and solvent extraction to recover organics from water, and ion exchange and reverse osmosis to recover metals from electroplating rinse waters.

Recycling and reuse have more applications with liquid waste streams than with solid sludges or gases. Recycling as a means of waste reduction is usually an integral part of the production process for most industries, in part because it is the easiest to implement and document savings, but also because it closely resembles usual plant operation and pollution control techniques.

As an example, in a DuPont plant making Freon, hydrochloric acid waste was eliminated by installing a $16 million conversion unit to change anhydrous hydrogen chloride into chlorine, which is recycled back into the process, and hydrogen, which is used as a fuel input in the plant. This option, while expensive, was found to be the best long-term choice by DuPont management.

## EXAMPLES OF SOURCE REDUCTION PROGRAMS IN SOUTHERN CALIFORNIA

There are many solid examples of successful source reduction programs in Southern California, and specifically in the Los Angeles area. These programs vary according to the type of industry and manufacturing or technical process used as well as a wide variety of other factors related to individual circumstances.

Following are six examples of source reduction programs in Los Angeles which have proven successful. Each example is different, although all utilize some elements of each of the four categories for source reduction strategies described above, and most reflect the work of members of the Mayor's Advisory Committee on Hazardous Waste Reduction.

### 1. HUGHES AIRCRAFT COMPANY: LOS ANGELES (Aerospace Electronics)

Hughes Aircraft Company is the largest employer in California, employing approximately 80,000 people, roughly half of which are in Los Angeles County.

Hughes has had an aggressive waste minimization program for a number of years. Following are some examples of the results of this effort.

> **Replacement and Upgrading of Wastewater Pretreatment Systems** - Most older facilities have accomplished, or are in the process of accomplishing this effort to reduce dependence on off-site disposal of aqueous wastes. An example is a 450 gallon-per-minute pretreatment facility costing $1,800,000 that is currently under development. This system will eliminate 90% of the off-site disposal of electroplating waste and save approximately $150,000 per year in disposal fees at current prices.
>
> **On-Site Reclamation of Water-Soluble Machining Coolants** - An example at one location will eliminate approximately 8,000 gallons of waste per year and save $12,000 in disposal costs.

**Chemical Substitution of Less Hazardous Materials** - Substitution of chromic acid for an oxidizing bath of nitric acid and Ammonium Fluoride reduced waste generated by 50% and produced a less toxic waste.

**Ultra-Filtration of Electroplating Process Baths** - Reduces amount of solution used by 30-50% by prolonging the life of the bath.

**Substitution of Water-Soluble Solvents for Halogenated Solvents** - Allows on-site treatment and discharge to the sewer of waste water as well as reducing toxicity of solvents used.

**Use of Waste Magnesium Metal Turnings as Chemical Feedstock** - Turnings are transferred to a chemical fertilizer manufacturer to produce magnesium sulfate fertilizer or to a chemical manufacturer as process catalyst. This eliminates the disposal of this hazardous waste entirely.

**Further Waste-Minimization Efforts** - Hughes Aircraft Company, in cooperation with two other major aerospace companies, has received a grant from the State Department of Health Services to perform a hazardous waste minimization study. This study will include wastes which are currently being landfilled that may be suitable for minimization through application of process modification, on-site treatment or recycling. Another aspect of the project will be to study substitution of less toxic materials for certain processes.

### 2. BASF CORPORATION, ANAHEIM (Structural composites and adhesives)

A division of the BASF Corporation, the Anaheim Facility employs 275 people and generates annual sales of $28 million. The division manufactures structural composites and adhesives.

The corporation's goal is to reduce land disposal to zero and to recycle, treat or incinerate all wastes. BASF has taken a number of steps to manage and reduce waste at it's Anaheim Plant.

- All wastestreams are computerized so that detailed information on volume and composition is readily available.
- The facility utilizes a mobile solvent distillation unit for a solvent stream containing Acetone/MEK/Epoxy Resin. This recycled solvent is then reused in our process to clean dirty equipment. This has resulted in 86 percent cost savings in purchasing "new" solvents. The cost for recycling is approximately 50 cents per gallon for a 65% savings over the previous method. The short term benefit to this source reduction project is a reduced operating cost. Prior to utilizing this treatment method, land disposal was utilized. In the long run, BASF has minimized its liability and reduced the cost of producing its product.
- A mobile clarifying filter press unit has been utilized to clarify a waste stream containing 99% water and 1% epoxy resins. Prior to using the clarifier, this waste stream cost $2.75 per gallon for disposal. By utilizing the clarifier/filter press, BASF is able to extract the solids (epoxy resins). The water is discharged to the sanitary sewer within accepted standards. The epoxy sludge is being marketed as non hazardous road tar filler. The goal here was to minimize costs and long-term liability.
- BASF also seeks users for its scrap products and waste materials among BASF's 70 other divisions and outside companies. Scrap (off-spec) products are being sold as commodity items to boat and recreational manufacturers. This action has eliminated disposal as a hazardous waste and created a new product line for the company.

BASF has three motives in pursuing source reduction; decreased operating costs, reduced long-term liability and increased operating efficiency.

### 3. MAGNETIC MEDIA DIVISION (3M) CAMARILLO (Electronics)

The 3M facility in Camarillo has 1,000 employees and produces supply products for computer equipment. Items produced at the Camarillo facility include floppy disks, computer tape and data cartridges.

In 1986, the Camarillo facility generated over 14,000 tons of hazardous waste of which solvents were the major component.

Of the 14,000 tons:

- About 99.4% was recycled either onsite or at offsite facilities. The decision to recycle waste onsite or offsite is based on the volume of each waste stream. For higher volume waste streams, the capital cost of installing onsite recycling equipment is frequently lower than the cost of transporting the liquid wastes to an offsite recycling facility.
- About 0.1 percent was incinerated for energy recovery at 3M's incinerator in Minnesota. These concentrated solvent wastes have a high BTU value and are what remains after solvent recycling is completed.
- Only 0.5% was sent to a hazardous waste landfill.

Decisions are made after assessment of a range of issues, including cost and potential liability. It should be noted that corporate commitment to a waste minimization program is the first big step toward a successful program.

The Camarillo facility has also looked for other opportunities to avoid waste production:

- When pumping solvents between tanks, 3M vents the second tank (the one being filled) into the first tank (the one being emptied) rather than to the workplace or the atmosphere. Similar to the double hose pumps used at gas stations, this process traps vapors, avoids pollution and workplace exposures, and saves solvents.
- Rather than dispose of used solvents, 3M has built an activated carbon absorption process (4 beds with 16,000 pounds of carbon in each) in which the solvent-laden air is passed through the beds, which strip away and capture the solvent residues. The solvents are then removed by steam from the carbon beds, run through a distillation process, purified and returned as new to the manufacturing process.
- Due to EPA regulations that went into effect in November 1986, 3M had to find a creative solution to management of part of its treated waste residue or face the possibility of shutting down its onsite recycling process. Rather than seek a variance to the EPA rule, 3M negotiated an agreement

with a California cement manufacturer who operates a rotary kiln incinerator. The residue is a fuel input for the cement facility, 3M has provided for safe treatment of its residue, and EPA is satisfied that its new standards have been met.

The 1986 percentages for the Camarillo facility are representative of waste management practices for the past 10 years at 3M, and it is estimated that savings of $1 million per year are realized. These savings derive from avoided costs for raw materials, waste disposal costs and waste transportation costs.

### 4. CROWN CITY PLATING CO. - EL MONTE (Metal Plating)

Crown City Plating is one of the largest metal plating companies in the United States. The company's 500+ employees produce decorative copper, nickel and chrome plating, primarily for the automotive and plumbing industries.

Beginning in 1978, Crown City installed a $2.5 million system to provide treatment of dilute waste streams, largely water, to comply with state and federal water quality regulations. To offset a portion of the cost of the system, the decision was made to recover and recycle chromic acid rather than destroy and dispose of it. The system:

- Reduces the need for new chromic acid
- Eliminates the destruction and disposal of over 10,000 pounds of chromic acid each month, and
- Reduces the cost of complying with government regulations

Installation of the chromic acid recycling system was initially motivated by the desire to use the best available technology. This has resulted in less toxic material which must be disposed of and thus decreased liability. While the net result of this investment has been an increase in the overall cost of operation, the recovery and reuse of chromic acid has proven to be less costly than chemical destruction and disposal.

In early 1986 Crown City installed onsite equipment to destroy liquid cyanide wastes.

These wastes had previously been trucked to an offsite facility for treatment. This system:

- Chemically destroys more than 4,000 pounds of cyanide each month, and
- Eliminates the risk of transporting liquid cyanide wastes.

Although the cost of onsite destruction is actually greater than offsite treatment, Crown City believes that the elimination of the risk of an accident during transport justifies the investment.

In mid-1986 the firm began sending its metal-bearing sludges to a copper smelter in Arizona. The smelter extracts copper and silver from the sludges, which were previously landfilled. Any sludge remaining after the metals are recovered is encased in a hard silicate structure that allows for far safer land disposal. As a result of this program:

- Over 40 tons of sludge per month is treated and disposed of in a more secure fashion, and
- Copper and silver that had been lost is now recovered and reused.

Although there are limited dollar savings for Crown City for this program, the company has substantially reduced the uncertainty and potential liability associated with land disposal by reducing the volume, toxicity and mobility of the waste that must still be landfilled.

### 5. GENERAL MOTORS - VAN NUYS (Automotive Manufacturing)

GM's Van Nuys facility employs 2,500 people and produces about 450 cars per day. Annual salaries for the workers at this facility total over $160 million.

Changes in paint application techniques have resulted in major cost savings, both through decreased use of paint and reduced generation of paint wastes for each car the plant produces. In the past several years GM has reduced the volume of this, its largest waste stream, by over 50 percent.

The old paint spraying techniques resulted in a "paint transfer efficiency" of 30 to 40 percent. Simply put, only about a third of the paint actually adhered to the car. Using new technology that electrostatically charges paint particles to create better adhesion to metal, the transfer efficiency has climbed to between 80 and 90 percent.

In addition, the Van Nuys facility recovers all solvents used in cleaning paint-spraying equipment and pays to have these materials recycled offsite. Waste oils are also recovered and sold to an offsite recycling facility.

The benefits of these changes have been many:

- Although the Van Nuys facility is relatively old, the plant remains in operation while other GM plants are being closed. The facility has a high efficiency in car production, aided in part by improved painting techniques.
- Decreases in paint use mean that less solvents are used and thus less air pollution is generated. Hydrocarbon air emissions, which aid in the formation of smog in the atmosphere, have been cut in half.
- By sending waste solvents to an offsite recycling facility, GM's waste product becomes a manufacturing input for some other company.
- Minimizing liability is an important consideration. GM policy requires that GM staff evaluate the operation of any offsite facility before any wastes are sent there.

### 6. ARCO WATSON REFINERY - CARSON (Petroleum Refining)

The third largest refinery operation in California, ARCO's Watson facility employs 1000 people. The refinery produces a variety of products including gasoline, jet and diesel fuels.

Basic refining practices have changed very little in the past several decades. ARCO has found few opportunities to make major modifications in inputs or in production processes in order to sharply reduce the volumes of waste it produces. But ARCO has still made source reduction a top priority by:

- Adjusting processes to ensure that the composition of wastes are consistent.

Consistency is important for marketing wastes through the California Waste Exchange.

- Segregating wastes for ease in recycling or exchange.
- Using a combination of housekeeping techniques, recycling and recovery processes, ARCO has "delisted" twelve major waste streams, 75 percent of those routinely produced. Delisting means that at the point these waste streams leave the facility for recycling or final disposal, they are no longer considered hazardous by the state. Delisted wastes are far cheaper to manage and involve less liability because of the far smaller threat they pose to human health and the environment.
- Using the California Waste Exchange, operated by the state Department of Health Services, to locate industrial users for its waste streams. During the past several years, four wastes have routinely been given to other companies. Waste alumina, for instance is used by a chemical manufacturer to make aluminum silicate. Small particles of silica collected by the refinery's air pollution control system are used by a cement manufacturer to produce cement.
- Several refinery waste streams are routinely recycled. Water softening sludge is sold to a company for acid sludge neutralization. FCC Catalyst Fines are used as a raw material in cement. And Alumina, no longer useful because of moisture, is sold as raw material in manufacture of several alumina products.
- Efforts are made to reuse several off-specification products, and other general oily streams, in on-site plant operations before they become wastes.
- To initiate reduction, the plant uses API separators and operates DAF Unit to meet wastewater specifications while producing the least amount of wastes when treating RCRA-covered materials.

Use of the above techniques has meant that between 20 percent and 50 percent of the refinery's total volume of waste is no longer disposed of in the ground. Twenty percent of the facility's waste by volume is sent offsite for recycling or for direct reuse. In making these changes, ARCO is motivated by the desire to decrease costs, avoid liability problems and increase efficiency. Over the past four years, the Watson Refinery has steadily reduced the amount of hazardous waste it has disposed, from approximately 10,000 tons in 1983 to approximately 2,000 tons in 1986.

# CHAPTER V

# THE ELEMENTS OF A LOCAL GOVERNMENT WASTE REDUCTION PROGRAM: INFORMATION SERVICES AND TECHNICAL ASSISTANCE

As discussed elsewhere, the absence of comprehensive hazardous waste reduction policy at the state or federal level, and the nature of waste reduction itself, suggest that the best strategy for local government is to take the initiative and establish a self-directed waste minimization program.

Once a commitment to develop a local government program is made, the challenge becomes one of identifying and prioritizing the areas of greatest need (and opportunity), targeting higher risk sites and waste sources, identifying the available technical options and resources, and then matching solutions to specific generators or industry sectors. But the importance of the first step, a visible commitment, can not be exaggerated. An unequivocal public commitment provides the framework necessary for success.

As discussed earlier, data collection and assessment is important in targeting waste reduction efforts. Waste reduction programs, at least in the short run, will have to rely on an imperfect body of technical information about waste reduction solutions. Nonetheless, the available knowledge does have some usefulness, and each year programs on the federal level, in other states, and in California are expanding the necessary data base which will allow for greater precision in the future. In addition, early non-technical steps such as improved housekeeping can realize substantial waste reduction.

## ESTABLISH THE DATA AND THE PROGRAM IN UNISON

Successful waste reduction programs, such as in Ventura County, demonstrate that action need not be deferred while waiting for a more complete information base to be developed. Enough has been learned from current source reduction programs around the nation to show that substantial gains are possible using relatively simple and low-cost strategies.

Initial low cost strategies involve facilitating information exchange within the private sector and between the public and private sectors, providing the kinds of technical assistance that can eliminate barriers, and encouraging generators to develop in-house programs to reduce their own hazardous wastes. These steps can be undertaken in tandem with data collection and assessment.

Most of the currently established waste reduction programs around the country have similar components that can be summarized as:

- A data collection effort regarding local waste generation and management patterns and available technical options for waste reduction,
- An education and public awareness programs,
- An information clearinghouse to serve as a central source for information dissemination,
- A program to provide businesses with on-site waste audits and other forms of direct assistance,
- Local networks for information dissemination,
- A program to provide training for auditors and for in-plant personnel,
- Close working relationships with local universities that can, among other things, provide interns to assist the program, and
- Cooperation with trade associations.

In this chapter we look at the successful Ventura County Hazardous Waste Reduction program, and then examine the elements of a local government waste reduction program. These elements included the following:

## Components of a Successful Waste Reduction Program

- Data Collection and Assessment
- Education and Public Awareness
- Information Clearinghouse
- Local Networks for Disseminating Information and Assistance
- Waste Audits
- Other Forms of Direct Technical Assistance
- Training Support
- University Participation

## SUCCESS STORY: VENTURA COUNTY

Ventura County's hazardous waste reduction program is a good example of how an aggressive program can develop an accurate data base and achieve substantial reduction results in a relatively short period of time.

The Ventura County program combines many of the program components mentioned above, with data collection and assessment and on-site technical consultations, including waste audits, technical information on reduction and recycling methods and equipment, and direct assistance to businesses to develop volume reduction plans as required by RCRA. Between 1984 and 1986 hazardous wastes generated in Ventura County, and historically transported to landfills for disposal, were reduced by 70%.

In 1985, concerned with hazardous waste generators dependence upon land disposal, the Ventura County Environmental Health Department began a program to assist hazardous waste generators in the county reduce their volumes of waste. The Hazardous Waste Reduction Program has twelve staff members, several of whom are county health personnel trained in the subject area.

State DHS data collected from waste manifests was analyzed to identify companies that generated wastes in Ventura County between 1982 and 1985, the types and volumes of the waste streams, and their final disposition.

This analysis found that of the 1,116 companies that generated hazardous wastes in Ventura County in 1985, just 75 companies contributed nearly 95% of the wastes disposed in landfills. The major waste streams were oil field production wastes, acids, and aqueous and alkaline solutions that contained 90-98% water.

The second step was to send a questionnaire to the 75 companies requesting additional specific information on waste streams, reduction efforts and the potential for waste minimization. In many cases, the Department of Environmental Health assisted businesses in completing the questionnaire. County staff then began conducting waste audits on the sites which the questionnaires indicated had the greatest potential for waste reduction. Detailed waste audits were sometimes conducted as part of those site-specific waste management reviews.

Following an initial set of 50 on-site waste audits, approximately half of the 75 major generators found ways to avoid land disposal for their hazardous wastes, either by eliminating the generation of the waste or by the use of recycling. The remaining companies not audited in 1985 were audited in 1986. During 1987 the Environmental Health team hopes to audit many of the remaining smaller generators in the county.

The waste audits in some instances readily identified immediate solutions, generally involving simple improvements in management techniques. For instance, some firms were found to be disposing of recyclable wastes and even unnecessarily generating wastes. Other relatively unsophisticated technical approaches involved improving housekeeping practices by separating materials to facilitate recycling, or treatment and reducing waste volumes by using less water in production processes.

Several lessons resulting from the program include:

- Cooperation between the public and private sections is the key to success. Private section resistance to the Department's efforts has usually been a result of inadequate information or resources to address the problem. In fact, Ventura County has developed Voluntary Participation Agreements, in which firms sign and pledge to reduce wastes. Where the company is a branch or plant of a larger company, the agreement is signed by the parent company, thereby ensuring greater cooperation.

- Local government commitment to waste reduction sets the tone and encourages the active participation of industry. This is especially true in instances where employees such as maintenance staff and plant engineers recognized the problem but needed the support of supervisors to justify waste reduction efforts.
- Program stability breeds trust. The Waste reduction program was accepted fairly readily because of its location in a stable and known county department. County businesses believed the program was serious and would be an on-going effort. If the county waste auditors "didn't get to them the first time they would the next."[1]

Although Ventura County's total hazardous waste volume represents only 2% of the California total, its program is a surprising success. How do the components of a program such as Ventura County's fit together to form a cohesive and comprehensive effort?

## I. EDUCATION AND PUBLIC AWARENESS

Any on-going program which seeks to change the way industry and the public perceive a problem, and which seeks to encourage substantial changes in the ways industry operates, requires a strong education emphasis to generate public awareness and support. This calls for an active effort that goes beyond the relatively passive government role of information dissemination. A new program in waste reduction must be "sold". Fortunately, there is a high degree of public recognition of the problem of hazardous wastes, and the local media can assist in informing the public about new local government activities.

Public opinion polls have consistently shown a high level of concern about toxic issues. A May 1986 Harris Poll found that 92% of the American public consider hazardous waste disposal a serious concern.[2] This public concern and increased awareness will help motivate individual businesses to examine waste reduction. But this spur to private action will be most successful when combined with an active, and positive, education component.

## EDUCATION EFFORTS

Cooperative education efforts that bring together as many participants as possible will be the most successful. The use of trade and associate meetings, a city-sponsored conference, industry-specific technology transfer workshops, and the media can reach the private sector in a cooperative spirit.

## TRADE ASSOCIATIONS

Industrial trade association meetings involving discussion of waste management issues are important forums for reaching corporate policy-makers and senior engineers. Trade associations and general business associations such as chambers of commerce, often focus on regulatory compliance and cleanup strategies, and provide an opportunity to promote city reduction and recycling programs. An added benefit of such meetings is the opportunity for geographically linked firms to explore mutual reduction and recycling programs.

It would make sense for the City to assist in the organization of a Speaker's Bureau to take advantage of these and other opportunities to be able to effectively advocate source reduction. Also important is identifying ways of directly reaching the senior management, who will not be present at trade meetings but whose interest and commitment is the key to successful waste reduction within an individual firm.

## CITY-SPONSORED CONFERENCES

Even though they require substantial planning, city-sponsored conferences can be remarkably successful because they offer the opportunity to present specific reduction techniques to a large number of industry representatives at once. Because experience has shown that large conferences have a diminishing rate of return, a concurrent strategy might also be to plan a series of mini-conferences that address particular aspects of waste reduction.

Several states have held state-wide conferences and, based on these experiences, officials have stressed the importance of offering detailed discussion by firms which have successfully reduced their own waste streams, and letting industry speakers take the lead as much as possible. Equally useful is the participation of vendors who offer "off the shelf" devices and can discuss the merits and costs of their equipment.

California trade associations' interest in source reduction is strong. For example:

**The Western Oil and Gas Association** has organized a sub-committee which has developed studies concerning the feasibility of incineration of hazardous wastes, and through its Alternative Technologies Task Force has recently developed a study along with the Department of Health Services and the Environmental Protection Agency (EPA) related to reduction and disposal strategies for solvents and oily wastes. The Association is also developing joint studies with DHS on potential waste minimization programs for the industry.

**The California Cast Metals Association** co-sponsored in 1986 two seminars with the Department of Health Services, in Los Angeles and Fresno, on waste reduction in the cast metals industry. The seminars included demonstrations of a promising solidification-process technology for the treatment of metal residues present in foundry sands. Industry representatives attending the two seminars represented approximately two-thirds of the non-ferrous metal cast foundries in California.

## INDUSTRY-SPECIFIC TECHNOLOGY TRANSFER WORKSHOPS

City or state-sponsored workshops can present specific technologies and available information to industries within a targeted sector, businesses that make similar products and generate similar wastes and can help develop strategies for implementation with industry's help. These workshops can be one of the most effective devices for information dissemination, and serve as a direct extension of the assistance provided by an information clearinghouse as discussed below.

These workshops will be most effective if they are organized by the private sector itself with local government participation. Workshops are good follow-up to a large city-sponsored conference, which can generate enthusiasm and motivation because of the city's demonstration of commitment. Necessary available information on the industry-specific technologies should be collected and put into convenient and usable formats, and other forms of direct assistance such as waste audits should be available to generators as an offshoot of the workshop.

Examples of workshops in other states:

- Massachusetts sponsors two or three workshops annually for industries which generate the state's priority waste streams, then compiles summary papers which are distributed to industry.
- Minnesota, focusing particularly on smaller businesses, held a series of seminars targeted for dry cleaners, auto service stations, metal refinishers, printers and hospitals during 1986.
- Focusing on successful reduction efforts, North Carolina held workshops targeting firms that generate solvent and electroplating wastes to demonstrate how some plants have already developed and implemented waste reduction techniques.[3]

The California Department of Health Services in late 1986 conducted a workshop in Los Angeles to demonstrate the results of a contractor study of solvent waste reduction techniques.

## NEWS MEDIA

Given the extreme importance of the news media in shaping public perceptions, a liaison officer or public information procedure should be developed to make certain that clear and accurate information is available and publicized.

## PUBLIC RECOGNITION OF INDIVIDUAL SUCCESSES

Public recognition is an easy and positive way to increase attention for source reduction, and is thus a frequent strategy for mobilizing support for a waste reduction program. Both larger and smaller companies deserve recognition for successful waste reduction efforts. The City of Los Angeles could provide a Mayor's Award for outstanding excellence in waste reduction efforts.

North Carolina has a annual governor's "Award of Excellence" for businesses, based upon a list of recommended success stories compiled by its Hazardous Waste Board. Michigan and Tennessee are both initiating similar awards programs.

## II. ESTABLISHING AN INFORMATION CLEARINGHOUSE

Crucial to any hazardous waste source reduction effort is the creation of an information repository, a central information clearinghouse, with a staff to collect, organize and distribute state-of-the-art information. A particularly well-developed clearinghouse can answer many of the technical questions that the private sector, and particularly small businesses will have. Computer access is the key to readily accessible information.

An effective clearinghouse collects and processes the latest literature, incorporates the most recent research and industrial examples into its database and documents successful programs from within California as well as other states. A clearinghouse can be a reliable guide to valuable publications which anticipate or address specific industry or public information needs.

Clearinghouses are often passive resources. But a well-developed clearinghouse, such as is found in several other states, has the potential to become an active resource, with its efforts linked to aggressive technical assistance and educational programs.

A common finding of studies which have analyzed inhibiting factors on industry, especially small businesses, to act to implement source reduction programs is the lack of a clear idea of what to do and how to go about getting started.[4] This need for information and technical assistance is also a preliminary finding of the upcoming waste reduction report from the Southern California Association of Governments.[5]

### INFORMATION AND TECHNICAL ADVICE

An information clearinghouse may provide information and assistance: by providing a reference center, having trained staff to provide information on specific reduction processes, equipment, and regulatory requirements, maintaining an information phone line to answer questions from generators, developing literature, and maintaining a referral system for waste exchanges.

Three types of information should be made available to generators who contact the Clearinghouse for help:

- Waste reduction literature and references.
- Professional consultants and trade association lists.
- Lists for reduction equipment and vendors.

Minnesota's Technical Assistance Program (MnTAP), for instance, has accumulated over 100 technical references on waste reduction opportunities for many industries, and adds to them as new information becomes available. These references are logged into a computer database for easy access by keyword. A second database is used to hold information on available professional technical consulting assistance. Lists of these contacts are distributed to generators.

North Carolina established its Pollution Prevention Pays (PPP) Program in 1983, and provides information primarily through its clearinghouse. References, articles, research papers, and case studies are categorized by Standard Industrial Classification (SIC) code to ease referral of specific information.[6]

## DATA MANAGEMENT SYSTEMS

To stay current with the existing and most recent literature on technical advances, newly released information documents, and to take advantage of some of the industry-specific information already compiled by other states, the clearinghouse needs a computer-based data management system and a skilled system operator to enter and interpret the information provided from external sources.

Computers can be used in a variety of ways. In New York, the state's Environmental Facilities Corporation uses computers to augment an extensive in-house library by accessing state library files. The clearinghouse staff uses the information to provide direct technical assistance to individual firms, ranging from development of in-house reduction strategies to reviews of commercial equipment. The computer capability also allows staff to run searches on a variety of commercial databases and to screen for particular items that apply to specific questions from an industrial client.

### INFORMATION PHONE LINE

The purpose of an information phone line is to provide an easy, accessible and free phone number for generators to call when they need information. If the phone line is placed in a non-regulatory office (such as a clearinghouse), generators who may otherwise be fearful of additional scrutiny may be more willing to request information.

In a well established telephone assistance program, a procedure is created which allows significant information related to the specific question to be written down, including current waste management and manufacturing processes, future waste management, compliance requirements and waste stream make-up. Attention can then be focused on the specific circumstances of the firm requesting assistance.

Minnesota's MnTAP program operates a toll-free telephone information service for generators. During the first six months, 150 firms called for advice on waste reduction and improved waste management. Approximately ten percent of the callers requested additional assistance through on-site consultation.[7]

### REFERRAL FOR WASTE EXCHANGE

The Clearinghouse can also help publicize the existence of the California Waste Exchange, and can provide referrals to the Exchange, discussed in an earlier section of the report.

## III. LOCAL NETWORKS FOR DISSEMINATING INFORMATION AND ASSISTANCE

One of the most important aspects of efforts such as waste minimization, which seeks to change institutional behavior patterns and influence manufacturing decisions, is to create the networks within industrial sectors which facilitate the information exchange and encourage change within the business community itself.

Networks are a cooperative effort that link similar entities with similar problems. Networks will particularly important for waste reduction, an area in which a large number of businesses of varying size, manufacturing processes, and capital resources are faced with the same set of incentives to seek the same general set of remedies.

Networks can be formal or informal, but generally rely on information exchange and occasionally problem-solving studies or cooperative economic ventures. Such linkings can begin through the efforts of local chambers of commerce, or through any number of industry groups and trade associations.

Local government may find it beneficial to encourage independent, private ventures by related firms in this area. There are a number of instances of industry groups who have combined efforts to accomplish what a single company may not have had the resources or impetus to initiate.

Over one hundred electroplating firms clustered in the New York/New Jersey metropolitan area formed a cooperative to research on-site recovery technologies, test equipment, and to take advantage of the economies of scale by building a centrally located metals recovery facility.[8] One indication of government commitment would be to work with state agencies to provide excelerated permitting for a cooperative effort. Trade associations could also be encouraged to forge links between similar firms and industries, and begin an information sharing program that disseminates information to the membership.

The City of Los Angeles can take a leadership role to encourage networks through seminars and workshops, targeted towards specific industries and through a city-wide conference on hazardous wastes in which all segments of the Los Angeles business community would participate.

## IV. WASTE AUDITS

Direct technical assistance for the waste generating community, by ensuring that waste reduction information and assistance is provided to those who need it, is at the heart of a successful waste reduction effort. The most direct methods of providing technical assistance, on-site visits, consultations and audits of individual firms, may be relatively expensive, but as the Ventura County program demonstrates, major reductions can be realized rapidly.

## WASTE AUDITS: WHAT THEY ARE

Waste audits are one of the most powerful tools in any waste reduction program. A waste audit, like any form of auditing process, involves the analysis of a particular system using a consistent set of criteria. Generally speaking, a waste audit attempts to give an overall view of a particular firm's manufacturing and management processes. The level of detail can vary considerably, ranging from a review of simple housekeeping measures to sophisticated "mass-balance" analysis in which the entire waste stream, including the volumes and forms of raw material inputs, are tracked through to the end of the production process in an effort to identify areas of material loss and strategies for process modifications or material substitutions , or simply improved housekeeping.[9]

Specific and onsite waste audits are important for waste reduction because of the considerable variance between manufacturing processes, even within the same industry. What this means is that there are few entirely successful generic waste reduction techniques, and the degree of variation increases as manufacturing processes become more complex. Audits provide the kinds of information that companies need to evaluate options and to tailor reduction techniques to individual situations.

A waste audit can be performed by in-house personnel, if sufficient expertise is available, by independent consultants, or by trained auditors from public agencies. Although specific criteria and options vary considerably between industries, and even among firms within the same industry, the elements of a waste audit are fairly consistent, and are based upon the criteria used with the highly effective energy audit programs during the 1970s.

The audit should provide a review of existing management practices and an analysis of current waste management costs. An accurate understanding of current costs is important to use as a baseline against which to measure future alternatives.

Once the data gathering phase is complete, the task will be to prioritize waste streams according to the costs of management and the associated environmental or safety problems. In other words, a risk and regulatory analysis is prepared. The end product of the audit is a detailed evaluation of reduction options according to economic feasibility, including cost and potential return on investment, implementation targets, and a framework for establishing waste reduction priorities.

## ESTABLISHING A WASTE AUDIT PROGRAM

A Waste Audit Program can be relatively inexpensive way for a municipality to assist hazardous waste generators identify and implement waste reduction and recycling measures. The components of an audit program would include:

- A series of self-audit manuals for generators in different industries who have a higher level of technical expertise;
- Capability to perform on-site audits by experienced auditors, and to provide written reports covering reduction opportunities;
- Referral to professional consultants for more detailed plant study if the results of the initial audit indicate that a more thorough review may result in additional reduction options;
- Assistance in implementing specific waste reduction options, including assistance in selecting a contractor or equipment vendor for process modifications and new equipment.

## COSTS

The costs of performing an audit vary. In Maryland, the cost of an initial in-plant audit has been estimated at $1,000 - $2,500, including the preparation of a report. A more detailed plant study could easily cost $7,000 or more per plant.[10] The Department of Health Services reports that recent audit studies of small firms have cost them approximately $5,000 per company. However, a simple audit on a small company would be substantially less, depending upon the use of in-house resources and personnel.

Audits may also be required by financial institutions prior to providing funding for waste reduction, and by insurers prior to providing pollution liability coverage.

## SHOULD AUDITS BE MANDATORY?

There is a division of opinion on this issue. While some believe that mandatory audits of all firms that generate waste is the only way to insure honesty and responsiveness, it appears that there are a series of related actions that can achieve the same results with less cost and intrusion.

The City could require each generator to submit an uncomplicated form on an annual basis that lists the details of all hazardous wastes that are generated. This includes wastes that are disposed of onsite to air, land or water, those that are recycled or re-used, and those that are sent offsite for treatment and disposal.

Rather than audit every firm, the City could establish internal criteria for "selective" auditing, a technique such as that used by the Internal Revenue Service.

Another suitable approach that could be implemented by the City is to negotiate "waste reduction" agreements with those businesses that receive permits from City departments. This approach has worked in Ventura County.

For instance, the Bureau of Sanitation provides sewer discharge permits to approximately 7,000 of businesses in the City of Los Angeles. If the Department were to set priorities according to the volume and/or toxicity of a permittee's effluent, "high-priority" facilities could then be examined for waste minimization opportunities. Audits could be arranged as needed.

## WHO SHOULD TRAIN AUDITORS?

Potential trainers of auditors include universities, community colleges, industry associations, engineering societies, and private firms. In California, the University of California Extension is a potential candidate for both organizing auditor training programs and for setting up and administering audit programs.[11]

## AUDIT STANDARDS

There are presently no audit standards, merely general guidelines. The checklists being developed for specific industries by the Department of Health Services will provide a useful benchmark for auditing within specific industries.

## HOW SHOULD AN AUDIT PROGRAM BE PROMOTED?

By name alone, audits may not carry a positive connotation. But audits can be promoted in several ways:

- Target particular industry groups with developed audit formats, such as those from the State DHS,
- Involve industry trade associations in outreach to business,
- Publicize success stories,
- Emphasize and document benefits (reduced liability, risk, costs, and compliance).[12]

## EVALUATION

The purpose of an audit is to ascertain what management or technical changes will reduce hazardous waste generation within an industrial process. The information and analysis provided by an audit will allow an informed choice between options, and allow managers to justify investments (particularly in instances where a business faces fines, adverse publicity or shutdown) which are cost-effective.

Whenever possible, firms should be re-audited to determine whether changes have resulted in the predicted outcome of decreased waste generation, and to document the types of changes that have been made, and the amounts of reduction achieved.

## VI. DIRECT TECHNICAL ASSISTANCE TO GENERATORS

Direct technical assistance will play an important role in encouraging waste reduction and recycling of hazardous wastes, particularly for small firms. Many firms have little technical expertise beyond the operation of their own manufacturing processes, and thus are often not aware of waste reduction and recycling options. Simply being made aware of these options through information programs and clearinghouse efforts, however, may not be enough. Smaller businesses, and even larger firms with internal expertise may need technical assistance, particularly when it comes to looking into more complex technical solutions for waste reduction.

Direct assistance beyond waste audits may include providing technical assistance to groups of small generators with similar production streams and engineering consultations. One example of a successful technical assistance program is Minnesota's MnTAP.

## MINNESOTA TECHNICAL ASSISTANCE PROGRAM (MNTAP)

Minnesota has developed one of the best over all technical assistance programs in the country. Established in 1984 and operated through the University of Minnesota, MnTAP has developed an effective outreach program to generators which includes publications and mailings, informational meetings, seminars and conferences, a telephone hotline and consultation, technical research assistance, and plant site visits for audits and technical assistance. But in addition, MnTAP matches engineering interns with companies to help them develop waste reduction programs. Although the program was primarily designed to assist small businesses to reduce any economic hardship that small volume generators might experience when brought into the RCRA regulatory framework, over half of MnTAP's clients are larger companies employing more than 1000 employees.

## ASSISTANCE TO SMALL GENERATORS WITH SIMILAR PRODUCTION STREAMS

Collective strategies can be developed for generators with similar waste streams and/or that are located in geographical proximity. Reasonably generic strategies can be developed for application to similar generators. Another option is to help geographically related firms form self-help collectives to pool their resources to implement reduction and examine recycling and reuse options.

Although waste management rather than a strictly waste reduction effort, hazardous waste pickup programs are also examples of attention to special problems of small quantity generators which could also serve source reduction goals.

Trade groups could be encouraged to directly address the waste reduction needs of their members. For example, a New England drycleaning trade association began a regional program to pick up and store small quantities of chemical residuals from member firms. Wastes collected and stored until sufficient quantities are available to recycle or to offer for exchange.

## ENGINEERING CONSULTATION

Direct engineering assistance to individual generators in establishing waste reduction programs can offered in conjunction with the waste audit program and the information clearinghouse, or may be established separately, perhaps through a university at which technical expertise is already present. A more sophisticated version of the waste audit program could place engineering students on-site, such as with the Minnesota effort, to help companies develop waste reduction programs. Such engineering services can also be provided by the private sector, by companies and independent consultants with expertise to provide such services for a fee.

Private consulting companies will greatly expand their services to provide auditing and technical expertise for waste reduction to businesses. With the development and further standardization of such consulting services, costs will decrease. If private industry can play a role in providing these services, the burden on local government will be eased.

Besides establishing education and training courses only, it may also be possible to utilize university resources by organizing consulting services composed of University staff and faculty, who would consult with businesses for a fee.

## EVALUATION AND ACCOUNTING DIFFICULTIES

An important but often neglected component of any technical assistance program, whether strictly informational or involving on-site auditing and active technical assistance for source reduction program development, is the inclusion of an evaluation procedure to document program effectiveness. Like followup waste audits, evaluation of direct technical assistance programs benefits both the provider and the recipient of the assistance. Effectiveness means evaluation to determine the relative economic cost/savings ratio of audit recommendations, as well as strictly waste reduction figures.

## VI. TRAINING SUPPORT

Once an active source reduction information services and technical assistance program is in place, it is possible to move to more aggressive strategies. One option is to train trainers who can go out to businesses and offer higher levels of technical assistance for specific actions, or to train individuals within a company on waste reduction assessment and applications.

Hard questions must be asked at this point regarding the relationship of the public and private sectors in encouraging waste reduction. Is the purpose to offer informational resources, or to effect change in industry in a more active manner? Or simply to assist smaller businesses which do not have the technical and capital resources? Is it the private sector's responsibility to assist small businesses? What is the shared responsibility and where is the line between responsibilities that clearly fall to the public or to the private sector? It is necessary to work out a division of costs that reflects social responsibility, corporate goodwill, public health protection and accessible financing.

If the decision is made to promote assistance in training private sector personnel, what may be most appropriate is a training program organized in conjunction with the city, local universities and trade groups. The aim should be both to establish a corps of trained auditors, and to provide continuing education to engineers and public health professionals to help them become proficient in assisting their companies in implementing an efficient waste and source reduction programs.

## VII. LIAISON WITH UNIVERSITIES

Most successful programs for source reduction have a strong working relationship with the local university system. Universities have technical and research expertise. This is costly to duplicate elsewhere. In addition, the universities may have active curricula with relevant programs designed to meet the growing need for personnel in the hazardous waste management fields, so it is possible to develop mutually beneficial internship programs with students, consulting services for faculty and staff, and even arrange thesis work.

Minnesota's Technical Assistance Program (MnTAP) is housed at the University of Minnesota in Minneapolis, although functions such as formulating long-range plans, publishing the newsletter, and choosing grant recipients and award winners rest within the Waste Management Board. In Illinois, the state placed its source reduction program, the Hazardous Waste Research and Information Center, in the state's environmental research agency but provided a physical location for the program at the University of Illinois.

Maryland Environmental Services, a state public corporation with no regulatory authority, subcontracts with the Technical Extension Service at the University of Maryland to provide services for waste reduction, such as on-site technical assistance, with a focus on waste reduction and compliance for small generators.

One question to address is whether a least some components of a waste reduction program, and their acceptance by the private sector, would benefit by being in a separate and non-regulatory institutional structure rather than being housed within one of existing agencies.

The State of Georgia is an example of heavy reliance on university-based technical assistance. The chief regulatory agency, the Department of Natural Resources, does not provide direct waste reduction assistance but instead refers firms to the independent Hazardous and Industrial Management Program of Georgia Technical University. This program was not mandated by law, but emerged as the result of agreements between Georgia Tech and the regulatory agency. Georgia Tech focuses on helping firms achieve regulatory compliance, with emphasis upon small generators, and gives suggestions on reduction and recycling options through on-site visits. The program also conducts training for industry representatives.

Los Angeles is fortunate both in the number of universities, and the quality of programs, to which the area has access. UCLA, USC, UC Irvine and Claremont College all have some programs or Extension courses related to hazardous waste issues.

## UC LOS ANGELES

UCLA has begun a multi-disciplinary program to train professionals who will address hazardous waste problems and conduct research on new technologies, entitled Engineering and Systems Analysis for the Control of Toxics (ESACT). ESACT is part of the University of California Toxic Substances Research and Training Program, headquartered at UC Davis, for which UCLA provided some matching funding. The Program includes six major areas of investigation, including development of new engineering materials and systems, as well as chemical and environmental analyses. Program components will include new, revised and existing courses from various disciplines, a seminar series, and workshops. The program also includes the Hazardous Waste Control Laboratory which is being organized with industry cooperation.

UCLA's School of Public Health has a doctoral program in Environmental Science and Engineering. Doctoral students serve internships with various groups and frequently government agencies involved in problem-solving.

Most important, UCLA has just received an $18 million National Science Foundation grant to become a Center of Excellence for the management of hazardous materials and wastes.

## UNIVERSITY OF SOUTHERN CALIFORNIA

USC's Institute of Safety and Systems Management in conjunction with the Department of Civil and Environmental Engineering, is developing a degree program on Occupational Safety and Health/Waste Management. USC also offers continuing education courses on waste reduction for hazardous waste generators in universities and colleges, and hazardous waste certification for truck drivers.

## UC IRVINE

The UC Irvine Extension offers a certificate in Hazardous Materials Management which includes courses on the Principles of Hazardous Materials Management, Environmental Toxicology and Quantitative Analysis.

## CLAREMONT COLLEGE

The California Forum on Hazardous Materials is a component of the California Institute of Public Affairs, which is affiliated with the Claremont Colleges. The Forum is a continuing program which brings together leaders from government, public interest groups, and the business community to discuss the long-range problems of managing hazardous materials in California. Educational projects include publications, regional workshops, and special seminars for groups such as journalists and senior officials of state agencies. Publications developed include: "California Toxics Directory: A Guide to Organization Concerned with Hazardous Materials in California", and "Approaches to Source Reduction of Hazardous Waste: Practical Guidance form Existing Policies and Programs" (by the Environmental Defense Fund), as well as an excellent working paper on waste auditing.

The City of Los Angeles should focus on developing waste reduction program components that can be assisted by the UCLA Center of Excellence program, and should determine if other local universities and colleges can play a role.

# CHAPTER V
## FOOTNOTES

[1] Conversation with Deborah Hanlon, Ventura County Environmental Health Department, March 24, 1987.

[2] *Serious Reduction of Hazardous Waste*, Office of Technology Assessment, Washington, D.C., Sept. 1986, p. 37.

[3] *Approaches to Source Reduction*, Environmental Defense Fund, Berkeley, CA, June 1986, p. 101.

[4] *Serious Reduction of Hazardous Waste*, Office of Technology Assessment, Washington, D.C., Sept. 1986, p. 56.

[5] Conversation with Joanne Freidrich, Southern California Association of Governments, April 6, 1987.

[6] *Approaches to Source Reduction*, Environmental Defense Fund, Berkeley, CA, June 1986, p. 92.

[7] Ibid.

[8] *Approaches to Source Reduction*, Environmental Defense Fund, Berkeley, CA, June 1986, p. 105.

[9] Michael Eaton, "Auditing for Waste Reduction: Its Role In California," California Institute for Public Affairs, Claremont, CA, November 1986, p. 17.

[10] Sloan William, et.al., "An Approach To Technical Assistance for Industrial and Hazardous Waste Generators," Washington, D.C., November 1985.

[11] Sloan William, et.al., "An Approach To Technical Assistance for Industrial and Hazardous Waste Generators," Washington, D.C., November 1985, p. 35.

[12] Sloan William, et.al., "An Approach To Technical Assistance for Industrial and Hazardous Waste Generators," Washington, D.C., November 1985, p. 37.

# CHAPTER VI

# INCENTIVES AND DISINCENTIVES FOR WASTE REDUCTION

## INTRODUCTION

The Los Angeles County Department of Health Services estimates that there are between 30,000 and 40,000 generators in the County, and that there are likely to be close to 10,000 generators within the City of Los Angeles.[1] Based on a mail survey initiated by the Fire Department in late 1986, that may be somewhat low. Given such a large number of firms that generate and must manage wastes in the Los Angeles area, how can the City's resources best be directed?

This section of the report examines the factors that motivate the hazardous waste management decisions of larger and smaller businesses. Understanding the incentives and disincentives that shape present and future waste management practices - the factors that motivate private sector decision-making - is crucial to shaping the report's recommendations.

## WASTE GENERATION BY LARGE AND SMALL FIRMS

In the past few years there have been several studies of the relative roles of larger and smaller businesses in California in generating hazardous waste. These estimates of waste volume and distribution by size of generator have gained in accuracy with the increased availability of data from a variety of sources such as waste manifests, onsite waste management reports and generator surveys.[2]

The numbers indicate that the vast majority of wastes, whether measured by volume or tonnage, are generated by a relatively small number of very high volume generators. Preliminary data from a new update of waste generation patterns being developed at the University of California at Davis for the state indicate that perhaps

100, or at most 200, California firms are responsible for up to 90% of the waste generated in California that is managed offsite.[3]

It is true, as larger generators sometimes assert, that much of what is counted as waste is actually water that may comprise well over 99% of the volume of a dilute liquid waste stream. Although the large total volume may not appear to be a good indicator of the actual hazard passed by waste stream, a substantial hazardous component is still present.

Conversely, although tens of thousands of smaller generators together may only comprise 10% of the volume of wastes going to offsite facilities, there is no reason for complacency. Many industries comprised mostly of smaller firms generate highly toxic and concentrated wastes.

What are the relative risks of waste management by larger and smaller firms? From the perspective of minimizing the use of hazardous waste land transport and disposal, it certainly makes sense for government agencies to focus on the larger contributors.

But smaller businesses usually lack the resources to closely monitor waste generation and management, and can't call on the staff that larger businesses retain to monitor environmental compliance. For a small business in a highly competitive industry, resources will be devoted to "productive investments" - those that provide a return and that directly contribute to plant productivity. Even when complying with regulatory requirements to purchase pollution control equipment, small businesses may not have the staff to ensure that the equipment remains in good working order.

Hazardous material and waste management by small businesses also provides significant opportunities for health risk to workers and the public and for releases to the environment. Serious accidents and accidental releases of toxic substances occur at both larger and smaller facilities, but it is often relatively more difficult for smaller businesses to manage the onsite risks of hazardous material use and hazardous waste generation.

Thus a waste reduction program with the broad goals of improving environmental and public health safeguards, as well as the specific goal of reducing the use of land disposal, should target both larger and smaller businesses.

## LARGE BUSINESSES AND WASTE REDUCTION

The case studies of Chapter 4 demonstrate a variety of factors that motivate the use of waste reduction techniques by larger businesses. The Los Angeles area employers cited in Chapter 4 principally note:

- Reduced liability,
- Increased efficiency,
- Decreased cost.

What sets large businesses apart from their smaller counterparts is their ability, once motivated, to pursue waste reduction opportunities, often with surprisingly good results. As the case studies cited above indicate, some larger companies do use government assistance programs such as those provided by the state DHS's waste exchange and recycling efforts. Government can also speed the adoption of waste reduction techniques by larger firms if efforts are made to ensure the transfer of ideas and approaches, and even specific technology, that may have a broad applicability within industries and between different industries.

## INCENTIVES

## SMALL BUSINESSES AND WASTE REDUCTION

For small businesses, motivation alone may not be enough. Lack of staff and financial resources can seriously hamper waste reduction efforts. But one crucial motivation, regulatory pressure, has certainly increased over the past few years.

**Small Business and California Law**: California's small businesses, and for that manner individual households, have never been exempt from state regulatory requirements regarding hazardous waste tracking, treatment, storage and disposal. In the area of small volume generators, California has long been more stringent than the federal government. The 1976 RCRA included a small volume generator exemption for firms producing less than 1000 kilograms of waste per month.[4] This exclusion meant that for much of the country small generators were not required to manifest hazardous wastes, and could continue to dispose of these wastes cheaply in municipal solid waste landfills that did not provide even minimal protections against the migration of hazardous waste.[5] In addition there were no provisions for warning waste haulers and landfill employees of potential dangers.

The 1984 amendments to RCRA created a new class of small volume generators, those producing between 100 kilograms and 1000 kilograms per month. Firms in this category are now generally subject to the full requirements of RCRA. Below the level of 100 kilograms per month small generators are still exempt under federal law. They are not, however, exempt from state regulations.

The effect of California's more stringent regulation is that small volume generators have long had a greater incentive, at least to the degree that the requirements have been enforced, to minimize the need to manage wastes after they are generated. As a consequence, California's small businesses have been, through the activities of their trade associations, active in shaping hazardous waste policy at the state and local levels.

## FACTORS MOTIVATING WASTE REDUCTION FOR BOTH LARGER AND SMALLER BUSINESSES

There are a number of general factors that motivate businesses of all sizes to consider investing in source reduction. The relative importance of these factors vary, of course from generator to generator. The size of the firm is also a factor in the relative importance of these factors.

**The Cost of Waste Management:** Waste management costs have reversed dramatically in the past decade. There are several separate components to this cost:

- **The Cost of Land Disposal:** Land disposal costs have increased sharply, by up to a factor of ten, as a reflection of the increased regulatory requirements discussed in Chapter 2. The cost increases result both from the cost of compliance with complex technical requirements for land disposal facility operators, and from the role land disposal operators play as acceptors of potential future liability. Also of importance is a decrease in supply and consequent increase in demand for land disposal facilities.

- **Land Disposal Fees and Taxes:** For over a decade the State of California has funded its hazardous waste management programs through a fee on land disposal. In the early 1980s land disposal taxes began to be collected to fund the State Superfund program. Now fees are also paid by offsite facilities with differing rates depending on the type of facility. The generator fee, sixty cents per ton of waste in 1979 has grown, and combined with the tax can total as much as $102.41 for the disposal of one ton of the most hazardous category of waste at a land disposal facility.[6] The Hazardous Waste Control Account fee and Hazardous Substance Account tax have played a major role in deterring the use of land disposal by greatly increasing the direct cost of land disposal.
- **The Cost of Regulatory Compliance:** State, federal and local government regulatory programs developed over the past decade to respond to public concern about toxic chemicals have unquestionably resulted in increased costs for the private sector. Annual compliance costs for California business have been estimated at about $1.7 billion.[7]
- **Transportation Costs:** As offsite land disposal facilities have decreased in number, average distances to offsite facilities have increased markedly for generators. This is particularly true for generators in the City of Los Angeles. Increased distances, combined with the pass-through of increased transporter costs resulting from recent regulatory requirements for haulers, result in sharply increased waste transportation costs. As with liability concerns, generators have looked increasingly to onsite solutions for waste management.

Although not all of these expenses result directly from regulatory requirements, there are also other more indirect factors that can be broadly defined as "cost", such as the time involved in obtaining required permits. in obtaining "delisting" of a hazardous waste in order to be able to put it in a solid waste landfill, etc. Waste reduction minimizes both the direct costs and the indirect costs of waste management by getting the generator out, at least partially, from under the regulatory umbrella.

**Liability:** Extensive contamination problems nationwide have focused attention on the short-term and long-term liabilities of hazardous waste generation. Under both federal and state law, generator liability does not end as long as waste constituents remain hazardous. Accidents involving offsite waste transport can haunt the generator even if the generator had no direct control over the release. The thread of liability is the longest for land disposal in which some wastes, such as heavy metals, may never lose their hazardous characteristics.

Generators are exposed to several forms of liability:

- The liability for the costs of remedial (cleanup) actions, past mistakes that need to be cleaned up now or will require action in the future.
- The risk of third part liability, toxic tort litigation arising from actual or perceived workplace or environmental exposures resulting from the activities of the generator. Litigation may involve hazardous materials or wastes.

The original RCRA required that some facilities obtain and maintain liability insurance called "liability impairment coverage." Coverage was to be required for both "sudden events", such as explosions or fires, and "non-sudden events", such as slow leakage of wastes into a groundwater aquifer used for drinking.[8]

But after an initial period of availability, private sector offerings of environmental impairment insurance have dwindled to just two carriers in early 1987.[9] Insurers had difficulty gauging the potential risk of sudden and especially non-sudden events. As a consequence insurers had no yardstick against which to set premiums. For both larger and smaller businesses new coverage is very difficult to find at any price and existing policies are frequently not renewed. Sudden coverage has remained more readily available because the probability of the occurrence of a covered event is far more easily ascertained.

Larger businesses are carrying very high deductibles, often millions of dollars for each incident at each facility. Some larger businesses, and perhaps most smaller ones, now have no insurance against incidents involving hazardous materials or hazardous wastes and are operating without any coverage.

Liability reduction is important for larger businesses, such as those discussed in the case studies of Chapter 3, but is also a powerful motivation for small businesses. It was estimated in mid-1985 that in California pending litigation for past releases of hazardous materials and wastes to the environment involved a total of about $3 billion in outstanding claims.[10]

**Siting Hazardous Waste Management Facilities:** With the difficulties of siting offsite waste management facilities, including regulatory complexity, public opposition, and other uncertainties many generators have turned to onsite solutions. But even onsite waste management techniques may engender public concern. At that point recycling and waste reduction, which may not required permitting, become the most attractive options.

Larger companies, perhaps more than smaller companies, have also been motivated by the public perception of their role in managing the hazardous materials they use and the hazardous wastes they generate. Large businesses have responded to growing public concern about toxic chemicals, sometimes even deciding to make innovative waste management a principal element of corporate interaction with the public.

## DISINCENTIVES

There are also powerful disincentives to waste reduction, factors that are barriers particularly for smaller businesses. Disincentives include economic barriers, technical barriers and regulatory barriers.

**Economic Barriers:** The primary economic concern is availability of capital. Larger firms can fund waste audits, and the resulting recommended alterations in waste management, from operating budgets. But for smaller businesses, despite decreased operating costs and increased efficiency that can result from investment in specific changes such as process modifications, capital is not available for the initial investment. Financing issues are the focus of Chapter 7.

**Technical Barriers:** Technical barriers for early stages of waste reduction most often will involve barriers to the access of information and to the smooth transfer of ideas and of information about successful techniques within an industry and between industries. There are technical limits to waste reduction also, points at which further reduction may not be physically possible or costs cannot be justified. But for most generators this second barrier, one of economics and feasibility, remains a distant goal. Technical assistance and informative access are of immediate importance, and they are the subjects of Chapter 5.

**Regulatory Barriers:** Regulatory barriers include provisions of state, federal or local law that may prohibit or make more difficult, specific steps in the waste reduction process. As an example, waste recycling was until recently adversely affected by permit requirements for offsite recycling that served as a disincentive to entry into this market. Recent changes in state DHS regulations have created a separate designation for recycling facilities as "resource recovery facilities", these facilities have separate permit requirements intended to balance the potential risks of recycling with encouragement rather than discouragement of private sector involvement in this beneficial activity.

Most regulatory barriers are likely to be the products of state or federal law, rather than of local provisions. As local waste reduction programs develop and government personnel work directly with businesses in implementing waste reduction, these local experiences will be valuable in determining what modifications of state or federal law are necessary to further spur waste reduction.

# CHAPTER VI

## FOOTNOTES

[1] Conversation with Anastasio Medina, Chief, Hazardous Materials Unit, Los Angeles County Department of Health, March 13, 1987.

[2] See Chapter 1 for a discussion of waste generation data for the Los Angeles region.

[3] Conversation with Dr. Robert Powell, Chemical Engineering Department, University of California at Davis.

[4] 1000 kg is roughly equivalent, depending on the density of the material, to three to five 55 gallon drums.

[5] Just one hundred small generators sending the monthly limit of 1000 kg to a municipal land fill is the annual equivalent of about 5,000 pounds of hazardous waste.

[6] Conversation with Dirk Mather, Fee Coordinator, Program Monitoring Section, Toxic Substance Control Division, State Department of Health Services, March 24.

[7] Peter Deibler, *Poisoning Prosperity: The Impact of Toxics on California's Economy* for the Commission on Economic Development, State of California, June 1985, p.55.

[8] Ibid., p. 69.

# CHAPTER VII

# FINANCING WASTE REDUCTION IN THE PUBLIC AND PRIVATE SECTORS

## INTRODUCTION

Chapter VI examined the host of factors that motivate waste generators to seriously consider waste reduction. While these factors appear to be impressive motivators, Chapter VI also looked at barriers to waste reduction. Lack of financing options may be the most formidable barrier for many generators, and especially for smaller businesses.

This section looks at options both for funding the City of Los Angeles' waste reduction program and for generator investments in reduction. The section looks at federal and state funding options but focuses primarily on opportunities to fund local government programs and generator efforts at the municipal level.

## FINANCING A LOCAL GOVERNMENT WASTE REDUCTION PROGRAM

As noted earlier, state, federal and local government hazardous materials and hazardous waste programs are funded in a variety of ways. State and federal options, aside from direct appropriations of public monies, generally involve taxes and fees on the regulated community.

Most common at the federal and state level are "feedstock" taxes levied on the hazardous substances used in production, the precursors to the hazardous waste generated as a byproduct of business activity, and "waste-end" taxes levied per unit of waste at the point of treatment or disposal. Each approach has its advantages. Feedstock taxes are a more predictable source of revenue but do not provide a direct incentive to waste minimization. The converse is true of waste-end taxes. As the state DHS has found in administering the Hazardous Waste Control Account, waste-end taxes are a powerful inducement to reduced use of land disposal, and for that reason fail to provide a stable and predictable revenue base.[1] We return to this subject below.

In any case, although state or federal funding might be available to offset local government program start-up costs, continuing funding must be generated at the local level.

**Federal Funding Options:** As noted elsewhere in this report, the federal EPA has chosen not to give high visibility to waste minimization. Until 1990, when more information on the effect of the 1984 RCRA amendments is available, EPA does not plan to implement an aggressive waste minimization program. EPA will provide some technical and, possibly, financial assistance to the states in setting up their waste reduction programs, but will not play a central role in establishing waste reduction programs at the local level.

It is unlikely that much of the financial assistance to the states will filter down to the local level. EPA funding may be an option for some start-up efforts, such as continuation of the North Hollywood project which was originally funded by EPA, but certainly can not be counted on as a source of long-term support. One effect of continued federal budget deficits may be an absence of EPA funding even to meet the start-up costs of innovative projects.

**State Funding Options:** As with federal sources of funding, state sources are few in number and are highly competitive.

- **AB 2948 (Tanner):** One option that may be present this year is funding through the appropriation currently proceeding through the legislature for local government implementation of AB 2948, the Tanner planning process. As much as $6 million in funding will be available. But Los Angeles would need to examine whether a separate city waste reduction project would be considered repetitious with the Tanner planning conducted for the region by the Southern California Association of Governments (SCAG). It may also be possible for the City to obtain a portion of the funding that SCAG is likely to receive for Tanner planning.

The AB 2948 funds are intended for planning, and not as continued sources of program support, and would be available only for the initial stages of a local government program, such as program design and data collection.

- **State Department of Health Services Grant:** A Los Angeles City project could be designed as a pilot project that would yield information of use to other jurisdictions in the State. As a pilot project, a portion of the initial start-up costs might be funded through a grant from the state DHS's waste reduction demonstration grant program developed in response to AB 685 of 1985.[2] Funded at a total of $1 million per year, the grants must be at least partially matched by the recipient, but may be sufficient for initial development of a program that would then be self-supporting. Ventura County's waste reduction program was funded initially through a DHS grant. In that county, continued funding will come through the generator permit fee levied by the County Environmental Health Department.[3]

**Local Funding Options:** There are two distinct phases in funding a local waste reduction effort, i.e., initial or start-up costs, and continued funding for a more mature program.

Local funding options that tap the regulated community can be designed as "add-ons", reducing administrative costs by using collected revenues from existing functions. An example is the use of the established industrial sewer discharge permitting system to collect a permit fee to fund source reduction efforts. Revenue generating mechanisms, such as the permit fee just mentioned, also provide a negative incentive to waste generators, raising the cost of waste management and thus providing an additional inducement to waste reduction.

It is necessary to carefully choose funding mechanisms. Rapid and sharp increases in private sector waste management costs can also lead to increased rates of illegal disposal. Cost increases will have particularly acute effect on smaller businesses with smaller profit margins. During the early stages of a new City waste reduction program, increased monitoring of generators will help ensure that illegal disposal does not become an attractive alternative.

From the above paragraphs we can conclude that there are four important elements in designing a funding mechanism for the City's waste reduction efforts:

- Minimization of administrative costs for the City, by using existing program functions,
- Providing an additional financial disincentive for the generation of waste,
- Ensuring that the financial burden on the private sector does not create increased illegal disposal, and
- Consideration of using several mechanisms to provide a wide revenue base without exaggerated impact on a minority of waste generators.

Several options for local funding include:

- **Fee on Offsite Waste Management Facilities:** AB 2948 (Tanner) added Section 25173.5 to the State Health and Safety Code and allows local governments to collect a tax of up to 10% of the gross receipts of any offsite multi-user facility used for storage, treatment or disposal of hazardous waste. The City of Los Angeles has no operating hazardous waste landfills but the gross receipts tax could be levied on one or more treatment facilities within the City. This tax should probably not be too large, however, since treatment is an activity to be encouraged, not discouraged.
- **Permit Fees:** A fee can be added to permit renewals and applications for new permits submitted by industrial dischargers to the City Bureau of Sanitation. Industrial discharges of dilute wastewaters usually contain a small toxic component. A permit fee could be a blanket fee on all dischargers, or could be adjusted according to the size of the size of the firm or the hazard of the discharged waste. Perhaps the simplest would be a two-tier system with different rates for smaller and larger dischargers. A similar fee mechanism for air emissions could be established in collaboration with the South Coast Air Quality Management District.
- **Generator Fee:** The City could arrange with the County Department of Health to collect a fee from the thousands of waste generators that the Department inspects within the City of Los Angeles.

This fee could be assessed either of two basic ways:

- On the basis of firm size as measured by net income or another economic measure. As discussed earlier, this manner of assessment provides a more predictable revenue stream but is a poor disincentive since it penalizes all firms equally, regardless of their waste reduction efforts.
- On the basis of waste generation as a function of the tonnage of waste generated and requiring offsite management. As discussed earlier this mechanism is less predictable but also provides a greater and far more direct incentive to reduce wastes and to conduct on-site recycling.

The use of one or more of these sources of revenue would result in substantial funds without creating hardship. For instance an offsite facility gross receipts tax could be combined with a generator inspection fee collected from several thousand generators, to provide continuing funding for a substantial waste reduction program.

In addition, collection of penalties can be tied to violations under any form of mandatory program. Although the rate of collection of penalties will be unpredictable, and cannot provide a guaranteed basis for funding a program, penalties can be collected whether the mandatory requirements include only relatively minor reporting data requirements or more substantial actions in the development of implementation of waste reduction programs.

Failure to report data or information can be penalized administratively through the collection of fines by mail. County generator inspections could result in assessment of fines at the time of inspection, if required elements of a waste reduction program are not in place. Of course, the collection of penalties, if pursued aggressively will be self-cancelling over time, as greater voluntary compliance results in fewer penalties.

## FUNDING GENERATOR WASTE REDUCTION EFFORTS

The second and most important element in funding source reductions is the investment that companies make themselves.

## FINANCING FOR LARGER BUSINESSES

Chapter IV focused on six case studies of successful waste reduction in the Los Angeles region. The major inducement for these efforts was reduction in the potential for long-term liability. Many larger companies have determined that waste reduction is beneficial, even if the benefits are easily quantified.

Once the decision has been made to pursue waste reduction, larger businesses have a variety of options for financing waste reduction efforts including venture capital, equity financing, commercial loans, corporate bonds, and operating budgets. The last, the operating budgets, will be the typical form of financing. Operating budgets will be the primary source of internal funding during the early phases of waste reduction in which a review of waste streams and management procedures will reveal low cost "housekeeping" changes that can provide significant reductions prior to the use of more expensive techniques such as process modification.

Larger companies are likely to take advantage of positive economic incentives, such as tax credits and depreciation of capital equipment, as discussed in the next section of this chapter. But for larger companies these incentives are generally considered an added bonus, rather than an initial inducement to pursue waste reduction.

## FINANCING FOR SMALLER BUSINESSES

Small businesses usually find it far more difficult to fund waste reduction measures. Operating budgets for small businesses often do not allow for expenditures that are not directly tied to near-term production goals. Private sector financing, such as bank loans, can be difficult to obtain for much the same reasons. There are several federal and state financing options, but because of serious drawbacks these options are not widely utilized by small businesses. The probable source of small business financing will be a proposed innovative private sector effort to package private sector financing with government guarantees of repayment.

Financial incentives for private sector waste reduction take two basic forms:[4]

- **Positive Incentives** include grant and loan programs, and the use of the tax code using tax credits and accelerated depreciation of equipment, to reduce the overall cost of specific investments. Grants and loans, on the one hand, and tax inducements on the other, have markedly different effects. Grants and loans are attractive to smaller businesses because they address the need for initial capital. Tax credits and depreciation are of greater benefit to larger companies that can afford to make initial investments from operating budgets.
- **Negative Incentives** are the mechanisms described above for funding federal, state and local programs, and include feedstock and waste-end taxes, permit and inspection fees and penalties for noncompliance that simultaneously generate government revenue and influence decision-making by raising the cost of "undesirable" activities. For instance, as waste-end taxes increase, so do waste management costs, and this can be a powerful inducement to minimizing the generation of waste.

Because the concern of this section is the financing of waste reduction by small businesses, the following discussion focuses on positive incentives that can decrease the costs at the front-end of the investment.

**Federal Loan Programs:** The federal Small Business Administration's (SBA's) Pollution Control Facility Payment Guarantee Program has been an intermittent source of financing. SBA guarantees payment of principal and interest on fixed rate loans, obtained from private financial institutions such as banks, that can cover the capital costs of pollution control or waste management projects, and that can be repaid over a period of up to thirty years.[5]

Since 1981, shortly after President Reagan took office, Congress and the Administration have had a continuing battle over retention of the loan guarantee programs. The Administration has repeatedly sought to remove the financing guarantee for small businesses, and the Small Business Administration itself has proposed regulations that would limit the value of the guarantee. Congress has supported retention of the program.

The continued uncertainty over the availability of the guarantee has made financing difficult. Loan guarantees, which can take six months to process, have been surrounded by uncertainty and many professionals in the financial community have spent more of this time urging retention of the program than actually processing forms with the federal guarantee.

SBA financing is available only for the purchase and installation of capital equipment. The result is that only certain equipment-intensive aspects of waste reduction are eligible for funding, such as the purchase of on-site recycling or process modification equipment. This emphasis on capital investment forecloses funding for other stages of waste reduction such as preliminary audits or the development of an ongoing hazardous material use and waste generation tracking system.

But SBA financing, even when available, has several drawbacks that limit its usefulness:

- A small business applicant must be able to demonstrate profitable performance over three of the previous five years. This provision limits SBA funding to established and more profitable companies. Many small businesses that are considered to be successful cannot meet this profitability criterion.
- Loans must be for projects that are necessary for pollution control. The intention of this provision is to ensure that subsidized financing is not used for profit-making investments that might be made regardless of regulatory requirements. But this provision also limits the usefulness of the SBA guarantee because many waste reduction investments will be found to be directly profitable, resulting in reduced production costs over time.
- A substantial loan processing fee and administrative delay in obtaining approval for use of the guarantee can be deterrents for a small business.

In summary, the SBA program is most useful for established, profitable small businesses that need to install pollution control equipment. The program is still geared to the hardware emphasis of early environmental legislation, such as the Clean Water Act that focusses on end-of-pipe solutions rather than on the broad range of preventive measures that comprise waste reduction. It is unfortunate that the federal program is not more flexible to the needs of small business.

**State Funding Programs:** The California Pollution Control Financing Authority (CPCFA) is an independent state agency established in 1973 to issue tax-exempt revenue bonds to finance investments in equipment required to meet regulatory standards for air and water quality. The bonds are sold at an attractive rate because they carry the high credit rating of the State of California. Hazardous waste equipment can be financed, but only as its primary purpose is to decrease water pollution.

Major California businesses have been the primary recipients of the bond revenues.[6] Since the late 1970's, however, the CPCFA has "grouped" several bonds composed of ten to twenty small business loans for sale on the bond market. Totaling several million dollars each, these grouped offerings for traditional pollution control equipment purchase take advantage of economies of scale by spreading the administrative costs of putting together and selling the bond among a number of participants.

But the CPCFA uses the federal SBA loan guarantee program described above to ascertain the credit worthiness of small business applicants. Thus many of the shortcomings of the federal program are also true of the CPCFA program. There is a loan processing fee that substantially increases the cost of a loan. In short, although CPCFA financing is somewhat more flexible than the SBA guarantees regarding the investments for which the monies may be used, small businesses find the program to be of limited use.

Attempting to address the problem of capital access for smaller businesses, 1985 legislation by Senator Garamendi, SB 59, established the Hazardous Waste Reduction Incentive Account. The purpose of the Account is to allow the CPCFA to assist small businesses to obtain alternative private sector financing through a variety of means such as lowering the effective interest rate of a loan by subsidizing a portion of the interest. The funds in the Account, $2.6 million, have not been used, however. A major problem is that in the absence of the federal SBA guarantee, private sector financing for small business pollution investments, still widely viewed by the financial community as "nonproductive investments" that make no contributions to profits, is extremely hard to obtain.

One currently proposed piece of state legislation on waste reduction, SB 714 by Senator Roberti, would repeal the statutory provisions authorizing the Account and instead allocate state revenues to developing a more direct waste reduction regulatory program through the state Department of Health Services.

Finally, as discussed earlier, the AB 685 grant program, administered by the State DHS, provides an annual total of $1 million. But these grants, for which the applicant must provide a portion of matching funds, will only be available annually to a handful of generators. While useful in demonstrating and publicizing the efficiency of waste reduction, the net effect of the grants on reducing waste generation in the City of Los Angeles will be only marginal.

One drawback of the grant program for many potential applicants is that the applicant must share information about the waste reduction techniques or technologies. Many firms, whether large or small, believe that sharing such information can result in a loss of competitive advantage.

## INNOVATIVE FINANCING TECHNIQUES

The private sector has initiated efforts to provide nontraditional hazardous waste management financing for smaller businesses.[7] In the Los Angeles area the Economic Development Commission of Los Angeles County and the Pooled Loan Marketing Corporation (PLMC) are proposing to offer an innovative program combining the resources of the Small Business Administration (SBA), local banks and financial institutions to provide small generators with financial assistance for source reduction. The PLMC, founded by a California municipal securities firm, is a private sector and for-profit institution designed to pool private bank financing to assist small businesses with investments in the hazardous waste field.

In order to circumvent some of the weaknesses of the Federal SBA loan guarantee program discussed above, the Economic Development Corporation proposes to combine the small loans needed by smaller generators into a single submission to PLMC. SBA guarantees will be far easier to obtain for applicants that pool many small businesses, and the credit worthiness of the individual small business participants will not be as closely scrutinized. The PLMC provides long-term fixed rate financing for small business, purchasing loans once they are secured with the Pollution Control Financing Guarantee of the Small Business Administration. The PLMC is an innovative means to minimize the administrative cost, both financially and in terms of red tape, of obtaining financing.

Because projects that "reduce, abate or control pollution" are eligible, the PLMC program has the potential to provide a percentage of the small generators in the City of Los Angles with funding to reduce waste generation.

While awaiting word on the above proposal, the PLMC is using the Small Business Pollution Debenture Program to assist small business needing loans in the loans in the $500,000 to $5 million range. The PLMC uses debentures, essentially I.O.U.'s, issued by the companies themselves and that are backed by the general credit of the PLMC. Local banks accept the debentures with the use of the federal guarantee because the credit of the PLMC, rather than individual small businesses, is used to back the loans.

# CHAPTER VII
## FOOTNOTES

[1] *Approaches to Source Reduction of Hazardous Wastes*, Environmental Defense Fund, 1986, pp. 71-82.

[2] "Recycling of Hazardous Wastes in California, November 1, 1985 to October 31, 1986," State Department of Health Services, January 1987, pp. 10-12

[3] Conversation with Deborah Hanlon, Ventura County Environmental Health Department, March 24, 1987.

[4] "State Programs in Waste Reduction", Contractor Report by David W. Allan for Congressional Office of Technology Assessment, March 1986, pp. 36-40.

[5] Conversation with James McCall, Miller and Schroeder, Minneapolis, MN, March 12th, 1987.

[6] See Footnote 5.

[7] *Fact Sheet*, Pooled Loan Marketing Corporation, Guaranteed Long-Term Financing For Pollution Control and Hazardous Waste Management Projects for Small Businesses, undated, and conversation with James McCall, Miller and Schroeder, Minneapolis, MN, March 12th, 1987.

# CONCLUSIONS AND RECOMMENDED ACTIONS

Against a backdrop of local hazardous chemical waste generation that may easily exceed a million tons per year, the City of Los Angeles has a unique opportunity to demonstrate its leadership by stepping forward and aggressively implementing a series of related activities that will result in reduction of the volume and toxicity of these wastes by as much as 20%-50% over the next five years.

The timing for such a program could not be better. Around the nation, government policy makers and business managers are awakening to the fact that waste minimization is the first line of defense against erosion of profits, threats of liability, and endangerment of public health and environmental resources.

To be effective, a waste minimization program must have at least three attributes:

1. It must stress the primacy of "source reduction" the prevention of generation over other management options.
2. It must recognize that toxic wastes are a "multi-media" phenomenon, not just a land disposal problem. Equal attention must be given to minimization of wastes that are discharges to the air, the water and the land. Each is equally important.
3. It must recognize the need to set priorities among generators, tailoring the program to assist "higher-risk" and less-responsive players first.

The obstacles to substantial waste reduction are as much behavioral and institutional as they are technical. Consequently, as a public policy issue, local government leadership can make a difference. Not unlike energy conservation measure that were initiated in the late 1970's, remarkable and lasting gains can be made as a consequence of the repeated application of a series of simple practices. Initially, it is by providing information and limited technical assistance and financial support that the City of Los Angeles can promote changes in attitude and performance that will pay attractive dividends.

At present, all of the players in the chemical waste management arena share a common goal, even though their motivations may vary. Progress is best served by voluntary and collaborative efforts in most instances.

It should be recognized that a productive program will take time and money, commitment and perseverance, but it is not an impossible task nor an endless process. Once the recommended actions have been carried out (and the benefits of upcoming state and federal initiatives become apparent), the results will be measurable and immediate. While attentiveness will always be required, in a few years new practices will have become fine-tuned and institutionalized to the extent that the spotlight can be turned to other critical issues.

The current absence of certainty about the precise volumes and toxicity of wastes generated in the City of Los Angeles is no reason to delay dealing with the obvious.

As the first major city in the nation to address itself to solving hazardous waste problems by developing targeted waste minimization strategies, the City of Los Angeles will set a model for other metropolitan areas to follow. Taking responsibility at the local level is the essence of good government, and Mayor Bradley, the City Council and the Board of Public Works deserve a solid round of applause for their foresight and support of activities to date.

The recommendations that follow are a blueprint for effective hazardous waste minimization. While each member of the Mayor's Advisory Committee on Hazardous Waste Reduction may not embrace the specific wording of every recommendation, we are all in agreement with the intent of the concepts as presented and look forward to assisting local leaders as words become actions.

Here, then, are the recommended actions:

1. **The Mayor and City Council should illuminate their commitment to waste minimization by endorsing a formal resolution or passing a local ordinance that establishes hazardous waste minimization as the top priority in the City's official waste management policy, with source reduction as the primary focus of attention.**

Such an action would set the stage for task-specific initiatives that will follow, and it is in keeping with recently enacted federal legislation which states that "the Congress hereby declares it to be the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible."

2. **An Office of Hazardous Waste Reduction should be established within the government of the City of Los Angeles.**

   For a comprehensive program to succeed, there needs to be a focal point of responsibility and accountability, as well as a clearly-defined, non-regulatory presence that will coordinate local activities. This office could be established within an existing city department or it could be a separate entity within the Mayor's office. In either case, it should not be buried in the bureaucracy.

3. **The Office of Hazardous Waste Reduction should be established as a pilot program, and it should receive a two-year funding commitment at the outset with adequate resources to support highly competent staff and consultant services.**

   The intent of establishing the office as pilot-program is to get the effort underway quickly, not to create another permanent set of staff positions. It should be recognized at the outset that ongoing activities upon completion of the pilot phase are expected to be fee-based and entirely self-supporting.

   In the interim, however, it is important to do it right. Good people create good programs, and it is worth the expense to pay for experienced professional assistance and provide reasonable support to get the job done. The marginal cost is modest as compared to the benefits, and on such a truly serious issue it makes no sense to trip over a quarter to save a dime.

4. **Within the Office of Hazardous Waste Reduction, initiate activities in the following program areas:**

a. **Create a computer-based information management system that compiles and maintains baseline data on the volumes and generators of hazardous waste in the City of Los Angeles.**

This is an essential activity, one that will allow policy makers to establish priorities and measure progress, based on better and more current information than that available from any other single source. It will be extremely useful to all city departments. It is not necessary to start from ground zero designing a coherent database program. Both San Diego and Minneapolis have effective programs, and each is willing to assist the City of Los Angeles.

This management information system would gather and interpret data that are already available from a multiplicity of external sources. Due to data gaps and formal inconsistencies among databases, this will be a challenging but achievable task. The intent is not to create the most elegant system, but rather to assess available information and put a functional tracking and reporting process in place.

Its critical importance is in the fact that it establishes a baseline against which program effectiveness can be measured. Without it, results will be inconclusive and focus will be lacking.

b. **Create an active "Clearinghouse" information center to assist generators.**

This also is a high-priority, and includes a range of public information and technical assistance efforts.

A variety of actions would take place in this program activity area:

- creation and operation of a "*library*" of information on waste reduction practices within specific industries, gathered from sources nationwide.

In essence, this is taking advantage of knowledge developed elsewhere. It is a systematically organized information resource center that would require the services of an experienced information specialist or a librarian rather than an engineer. Costs could be offset in part by fees charged for the location or reproduction of materials.

The information specialist could also provide referral services to those needing more technical assistance.

- publication of an informal, low-cost "*news bulletin*" on reduction successes, techniques, and demonstrations. For distribution through trade associations or directly to local generators.

5. **Recognize and publicize successful efforts via a Mayor's Achievement Award to those who provide leadership or verifiable reductions in waste generation.**

6. **In terms of public events, focus efforts on two related activities:**

   - The Office of the Mayor should sponsor and host a "*Local Government Leadership Conference on Waste Minimization*" in collaboration with other interested parties.
   - Once it is established, the Office of Hazardous Waste Reduction should organize a *series of one-day "working sessions"* for local generators that are problem-solving sessions on specific aspects of the issue, such as financing or input substitution.

7. **The Mayor should appoint a "Business Task Force on Toxic Waste" to examine the costs, feasibility and methods of waste minimization in the principal waste-generating sectors of the local economy, and to set measurable goals for annual and longer-term reductions.**

   Members of this task force should include many of those who have already served on the Advisory Committee on Hazardous Waste Reduction, as well as others who bring experience and leadership skills.

The Task Force should be assisted by a technical working committee, which would review specific proposals for their technical and economic feasibility.

8. **The Mayor and City Council should endorse and initiate a "Business Outreach Program" that would provide seminars by city agency technical staff on waste reduction to clients or permit-holders served by the agency.**

   With the assistance of specialists at the new Office of Hazardous Waste Reduction, staff from the Department of Water and Power and the Department of Sanitation could play a meaningful role in the City's efforts.

9. **The City of Los Angeles should turn its attention inward and accelerate efforts to reduce the hazardous materials it uses and the hazardous wastes it generates.**

   While the City has already established a hazard communication program and has dedicated the services of a staff industrial hygienist to review purchasing practices, further gains are available through product substitution and other methods. This issue takes on added significance in light of proposed legislation to bring public agencies under the purview of Proposition 65 requirements.

10. **The City of Los Angeles should aggressively seek funds for its waste reduction activities from external sources.**

    This is of significance as a means to augment funds committed from City resources. As a point of entry, the City should assert that its efforts deserve recognition and support from state and federal sources for planning and demonstration projects. Sources include proposed and recently enacted legislative mandates.

11. **The City should seek support and assistance from state agencies and from locally elected officials who serve in the California State Legislature.**

    For example, it is not unreasonable to ask that technical specialists at the Department of Health Services provide a limited amount of free consultation to the City as it implements its management information system, nor is it unreasonable to seek designation of the City of Los Angeles as the site for demonstration projects now generally identified in proposed legislation.

12. **Require all local generators to submit an annual report to the City of Los Angeles that itemizes hazardous materials purchased, hazardous wastes generated, disposition of wastes, reduction targets and successes, and recycling or re-use volumes.**

    This is not a burden on generators, as this information is already required by other federal and state laws (RCRA amendments, La Follette 1986 legislation). Rather, it is preparation of a simple summation that otherwise would require substantial work on the part of City staff. A trade secret protection element should be included, and the specifics of the forms and level of detail should be worked out by members of the Task Force.

13. **Establish a schedule of fees to be charged to local generators who fail to submit their annual reports or who fail to demonstrate verifiable reductions in hazardous wastes on their annual reports.**

    Revenues would be used to support technical assistance audits for those who are having problems, as well as to support other elements of the outreach program.

    Verification of reductions should be done via selective auditing of annual reports, not unlike Internal Revenue procedures.

14. **Require that new or substantially expanded business activities proposed in the City of Los Angeles both public and private submit a hazardous waste**

**minimization plan and have it approved by a designated City agency prior to issuance of any permits to operate.**

Components of the waste minimization plan can be established by the Task Force. The intent of this recommendation is to insure pollution prevention from the outset, rather than accept a higher degree of uncertainty and risk.

15. **Provide direct financial assistance through the Environmental Trust Fund, consistent with other priorities, to the unique source reduction joint venture proposed by the Metropolitan Water District and the Environmental Defense Fund.**

    This research project is a "micro-analysis" of chemical contamination of ground water in a selected Los Angeles area basin, focusing on halogenated solvents used in a broad range of industrial applications. Findings will be practical and invaluable in the development of "targeted" long-term plans.

16. **Establish a "Liability Insurance Advisory Committee" from among the leaders of the insurance services sector in Los Angeles to explore the feasibility of pooled "environmental impairment liability" insurance for local generators.**

    This action could provide relief to local generators who cannot afford or obtain insurance at present, could assist insurers in establishing a more concrete hierarchy of risks, could reduce rates for businesses with safe practices, and could lower the probability of illegal disposal.

17. **Provide support to the proposal submitted by the Economic Developm Corporation of Los Angeles to develop a pilot "pooled loan fin program" to provide affordable loans to smaller businesses for eq and process modifications to control chemical waste.**

    This appears to be an excellent opportunity to serve the parti small business.

18. **Establish a comprehensive, fee-based was successful efforts in Ventura County.**

19. **Organize the formation of teams of volunt of retired engineers and business manager successful nationwide programs of the Ser (SCORE).**

20. **Initiate action to seek an agreement with Angeles the "laboratory" for programs to recent $18 million grant from the Nation new Engineering Research Center for H University.**

21. **In concert with the larger waste generator seek to establish "Partnerships in Technica from the larger firms provide guidance i firms in the same or related industry sec basis.**

22. **The City Council should consider establis fees on all hazardous wastes generated in th**

    A comprehensive fee equitable and reasonabl method to support a serious local program.

    This fee schedule, details of which could be staff, would cover discharges to all media ( insure fairness by insuring that the highe produce high-volume or high-toxicity wastes.

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